

## **AFFECTED ENVIRONMENT**





# **NATURAL RESOURCES**

## **PHYSICAL RESOURCES**

### **AIR QUALITY AND VISIBILITY**

The management and enforcement of the Clean Air Act's air quality standards in the Death Valley National Park area is conducted by two entities, the Mojave Desert Air Quality Management District (MDAQMD) and the Great Basin Unified Air Pollution Control District (GBUAPCD). The Mojave Desert Air Quality Management District includes the desert portion of San Bernardino County (within the South East Desert Air Basin) and the Great Basin Unified Air Pollution Control District includes Inyo and Mono Counties (within the Great Basin Valley Air Basin).

The Congress established the Prevention of Significant Deterioration program as part of the Clean Air Act. To facilitate the implementation of this program, an area classification scheme was established. This classification scheme has class I receiving the highest degree of protection with only small amounts of certain kinds of additional air pollution (sulfur dioxide and particulate matter) allowed. The other two areas are class II, which allows moderate increases in certain air pollutants; and class III, which allows a large amount of new air pollution (Congress has yet to designate any class III areas). There are no class I areas in the California Mojave Desert. Death Valley National Park is a class II "floor" area, meaning that it may never be redesignated to class III.

### **Federal and State Nonattainment Areas**

The Clean Air Act developed national ambient air quality standards for a finite number of pollutants called "criteria pollutants." The criteria pollutants are: sulfur dioxide, carbon monoxide, total suspended particulates, nitrogen oxides, lead, ozone, and particulate matter less than 10 microns in diameter (PM<sub>10</sub>). State of California standards, which are stricter than federal standards, include additional standards for hydrogen sulfide and particulate sulfates.

Nonattainment areas are areas that are not in compliance with the National Ambient Air Quality Standards, and therefore must reduce pollution to reach compliance.

Nonattainment requirements include reasonable controls on existing stationary sources, most stringent controls on new sources, emission offsets, transportation control plans (including inspection and maintenance), and sanctions for failing to submit a plan.

The Environmental Protection Agency has classified most of the South East Desert Air Basin as nonattainment areas for ozone. Mono County levels have exceeded the National Ambient Air Quality Standards and may be designated nonattainment for ozone in the future. The Searles Valley planning area is also nonattainment for state hydrogen sulfide and particulate sulfate standards (Searles Valley planning area shares its boundaries with

three air pollution control districts: the Mojave Desert, Great Basin Unified, and Kern County). The San Bernardino County portion of Death Valley National Park is in nonattainment for California's state ozone standards.

Federal PM<sub>10</sub> nonattainment areas include the San Bernardino County desert area, Owens Valley, Mammoth Lakes, Mono Basin, and the Searles Valley planning area. Mono and the eastern portion of Inyo counties have not recorded PM<sub>10</sub> emissions in excess of the national standards.

### **Pollution Sources**

Visibility is probably the most important air quality resource within the desert region and is the most easily affected by activities that generate dust (especially fine particulates) and sulfur dioxide. Visibility impacts occur from long-range transport of pollutants from as far away as the San Joaquin Valley and the Los Angeles basin (RESOLVE study 1988, cited in BLM 1995a). The RESOLVE study estimates that two-thirds of the visibility degradation was attributed to sources within the San Joaquin Valley with the balance coming from local sources and the Los Angeles basin (BLM 1995a).

One nearby source of pollution is the Searles Valley (Trona) complex that produces soda ash, borax, potash, and other chemicals from Searles Dry Lake. Other nearby sources of emissions include Owens Lake, Owens Lake Soda Ash Company, U.S. Army's National Training Center at Fort Irwin, China Lake Naval Air Weapons Station, Briggs Mine, and Panamint Valley Limestone Quarry. Air quality monitoring activities occur at Death Valley National Park and at the Briggs Mine. The Briggs Mine transmits (via the Internet) its air quality data daily to the Great Basin Unified Air Pollution Control District.

Exposed lakebeds and farmlands lie in the Owens Valley and Mono Basin between mountain ranges. Wind-carried dust from these exposed lands in the valley affect air quality over the area (Inyo NFS 1988). Visibility has been affected to the extent that Department of Defense test flights over the Owens Valley are hampered or shut down 6 to 12 times each year (Inyo NFS 1988). The county, the Great Basin Unified Air Pollution Control District, the city of Los Angeles, the Department of Defense, and the Inyo National Forest are making coordinated efforts to resolve this concern.

Local pollution sources in the desert consist primarily of particulate matter from off-road vehicles, windblown soil, mining operations, livestock grazing, and agricultural activities. These sources have left certain areas denuded or sparsely vegetated, allowing wind erosion to occur and air quality to suffer, occasionally causing particulate standards violations at some locations.

### **NIGHT SKY**

Within Death Valley National Park, the night sky toward the southeast is noticeably impacted by lights from Las Vegas, perhaps with some Pahrump influence. This is

especially apparent while heading south from Grapevine and Stovepipe toward Cow Creek and Furnace Creek. Other light sources are essentially limited to the Furnace Creek and Stovepipe Wells areas of Death Valley National Park, residential lighting from small communities such as Shoshone and Death Valley Junction, vehicles, and minor stationary lighting. Nighttime activities at Briggs Mine may be observed from Panamint Valley and portions of Death Valley National Park overlooking Panamint Valley.

## **NOISE**

### **Vehicle Noise**

A high level of traffic is observed along State Highway 127 between Baker and Death Valley Junction (CalTrans 1996). Vehicle noise is generally not an issue in the park in spite of the many and heavily used roads including State Highways 127, 190, and 178, and NPS major paved roads. Because of the park's size, most areas are well away from traffic and its noise.

### **Other Sources of Noise**

Other areas where localized noise occurs are at the Dumont Dunes off-highway vehicle open area and at mining operations. Less localized is noise from military overflights. Frequent low-level military overflights are often seen in the Panamint and Saline Valleys. If the National Training Center's (Fort Irwin) expansion is approved, sporadic and significant localized noise would be generated in the southern boundary of Death Valley National Park (BLM 1996).

### **Overflights**

The park is in the vicinity of several U.S. Department of Defense facilities: Fort Irwin Military Reservation, U.S. Naval Weapons Center, China Lake, and Nellis Air Force Base. Military aircraft from these facilities often use airspace in the park. Although aircraft noise does not appear to affect wildlife, visitors to the area often react adversely to jet noise and sonic booms. In addition, some booms have caused damage to natural and cultural resources (NPS 1988).

Military overflights constitute the primary source of high-level noise incidents in the park. Parts of the park are within a joint service restricted airspace complex designated as a military operations area (R2508) that permits aircraft to fly at speeds exceeding 250 knots and at altitudes 200 feet above ground level or higher (DOD 1995). The military operations area is used on a daily basis by Navy and Air Force aircraft. Low-level overflights of various military aircraft are common in the vicinity of the park.

In 1976, Death Valley National Monument and Edwards Air Force Base signed an agreement stating that pilots would be instructed to fly at least 3,000 feet above ground level while within the monument boundary. Jet pilots from the Navy, Marines, Air Force, and the National Guard, fly over 60,000 flights per year from Edwards. Occasionally pilots have

erred or ignored flight restrictions and have flown in Death Valley below the 3,000 foot restriction. Upon receiving complaints from the public, the National Park Service will typically notify Edwards on the reported agreement violation.

Title VIII of the California Desert Protection Act, 1994, provides that:

Nothing in this Act, the Wilderness Act, or other land management laws generally applicable to the new units of the National Park or Wilderness Preservation Systems (or any additions to existing units) designated by this Act, shall restrict or preclude low-level overflights of military aircraft over such units, including military overflights that can be seen or heard within such units.

## **WATER**

### **Groundwater**

Groundwater is found underneath the park and varies greatly in depth and quality. The park's groundwater basins are recharged from surface and subsurface infiltration. Depletion of groundwater basins and a diminishing of water quality are some of the concerns that were expressed at public meetings. Groundwater is the park's principal source for desert springs, seeps, and streams. The maintenance of groundwater quality and quantity is critical to the survival of desert surface waters and their associated plant and animal life.

The major concern is that park water and water-related resources will be affected by up-gradient withdrawals and contamination. Death Valley National Park receives much of its water from the lower portion of the Death Valley groundwater flow system's flow from Nevada (Pal 1995). The Death Valley groundwater flow system is defined in general terms as the area where groundwater flow is toward Death Valley. Some groundwater inflow also occurs from areas in California that are adjacent to the park. The Death Valley groundwater flow system is believed, by the National Park Service, to be fully, if not over, appropriated. Existing and future appropriations of limited water resources from the flow system may result in impacts to park water resources. Additionally, potentially contaminated groundwater plumes from the Nevada Test Site or from the large cyanide heap leaching mining operation near Bullfrog could affect the regional aquifer that drains into the park (NPS 1988a).

Another site where extensive groundwater is being used at rates that exceed normal groundwater recharge is the Briggs Mine adjacent to the park. The Briggs Mine has an approved mining plan that calls for the groundwater withdrawal of about 640 acre-feet per year (BLM, 1995a). This increase in groundwater withdrawal is in addition to the existing groundwater withdrawal of 750 acre-feet per year from the Panamint Valley (BLM 1995a).

## **Surface Water**

Known surface water sources in the Death Valley region include seeps, wells, springs, and ponds. The small springs and seeps in the park offer isolated and limited water for plants, wildlife, domestic, or commercial purposes. Some springs produce potable water, but overall, water quality is poor because of high dissolved mineral concentrations (BLM 1996).

In 1972, some 330 water sources of varying dependability and quality were recorded within the monument's boundaries (FWS 1972). The majority of these water sources were found in the Cottonwood, Panamint, and Grapevine mountains. Discharges from these sources range from a minimal seep to rates exceeding 200 gallons per minute. Death Valley's enlargement to a National Park in 1994 added an additional 1.3 million acres. These new lands include additional water sources such as Darwin Creek, Saline Warm Spring, and many springs in the Nelson Range and Whippoorwill Flat areas of the Inyo Mountains.

Death Valley's perennial streams include Salt Creek, Cottonwood Creek, and Darwin Creek. The Amargosa River is also perennial, but only for short stretches, with its length varying seasonally. Other streams flow seasonally from springs in some of the larger canyons on the west side of Death Valley, such as in Hanaupah and Johnson canyons (NPS 1988a).

Perennial ponds are rare within the park, and they fluctuate in size with the season. The largest ones (more than 6 acres) are immediately north of Saratoga Springs. Several artificial ponds and ditches supplied by the Travertine Springs are maintained by AMFAC, Inc., on its Furnace Creek properties (NPS 1988a).

Cattle ranching and mining in the desert required changes in the natural water flow, quality, and supply. Flows from springs and seeps were diverted or dammed, water piped miles away from the source, wells were drilled, stock tanks excavated, and other developments were needed such as wind mills and troughs. These changes brought with them changes to the natural environment. When the flows from the springs and seeps were diverted, the remaining aquatic/riparian flora and fauna were greatly reduced or eliminated. The water piped from the springs and seeps or taken from wells and piped to tanks and troughs is used by cattle, burros, and wildlife.

## **Water Rights**

Initial research on outstanding water rights in the park at the State Water Resources Control Board in Sacramento revealed that there are approximately 45 appropriated water rights claims on 41 water sources (springs, seeps, streams, wells) in the park. See "Land Protection Plan" (appendix B) for a complete list.

## **Guzzlers (Water Catchments)**

A guzzler is a permanent self-filling water catchment. Most are similar to a cistern and are simple, low-maintenance devices that are essentially tanks filled by rain-collecting aprons

(Giles 1971). Guzzlers are installed and used to provide water for hunted species in arid areas. Nongame species such as reptiles, songbirds, and insects also use these manufactured devices. Birds enter the covered tank through an opening and walk down a ramp to the water. For bighorn sheep, piping extends from the storage tank to a drinking trough, which has a float valve to regulate the flow.

Game numbers have been increased greatly in parts of the arid West by the use of guzzlers (developed by Ben Glading, California Department of Fish and Game) (Dasmann 1964). Professor Dasmann warned that while the guzzler is functioning, animal numbers should be limited to the area's carrying capacity as "excess numbers of game can easily damage food and cover in areas near water, and in arid lands this damage is long lasting" (Dasmann 1964). This type of damage has been observed in the Mojave Desert near big game guzzlers but not in guzzlers designed for game bird use (McGill, pers. comm., 1997).

Death Valley National Park has five big game and two game bird (gallinaceous) guzzlers. The guzzlers were developed by the California Department of Fish and Game, the Bureau of Land Management, and volunteers prior to the park's expansion in 1994. A review of guzzler use by park staff concluded that two of the big game guzzlers received little or no use.

## **PALEONTOLOGICAL RESOURCES**

Death Valley National Park contains a rich and diverse, but fragile and irreplaceable paleontological record. The fossil record in the park area is nearly as extensive and complicated as the geological record. Much of the area's geology is exceptionally well exposed. Soil development has been greatly retarded throughout much of the area, and the outstanding exposures of geological features support an equally notable exposure of fossil remains. These organisms have value as (1) stratigraphic indicators for correlation of deposits containing them and for determination of relative geologic age (2) records of past life forms showing the course of evolutionary trends of plants and animals and (3) evidence of changing paleoenvironments.

A literature and records search was completed for the Death Valley National Park region by Robert E. Reynolds, Curator, Earth Sciences, San Bernardino County Museum, Redlands. The records and literature search identified a number of potentially sensitive fossiliferous areas within the park area. Significant paleontologic resources and records relating to paleobiostratigraphic events that occur within the park include:

- The world's oldest mitosing cells, 990 million years old, are preserved in silica in the Beck Spring Formation.
- Significant Cambrian trilobite and invertebrate fossil localities that mark the boundary of the Paleozoic Era, 550 million years of age.



- Significant occurrences of Paleozoic invertebrate fossils and the possibility of very old fossil fish in Death Valley National Park.
- Panamint Range localities that contain significant marine cephalopods and invertebrate fossils.
- The early record of the Oligocene Tertiary Era from north of the Mojave Desert is found in the Grapevine Mountains in Death Valley National Park; important fossils include rodent, canid, horse, heliaetid, brontothere, rhinoceros, oreodont, and leptomerycids.
- Extremely important Late Miocene trackways, associated with important vertebrate fossils, occur in the Black Mountains in Death Valley National Park and in the Avawatz Mountains south of the park; the Black Mountains area includes a wide range of camel, horse, gomphothere, and aquatic bird trackways associated with a shallow freshwater lakeshore.

### **GEOLOGIC RESOURCES**

Death Valley National Park is, geologically speaking, a part of the larger Basin and Range Province. The park's oldest rocks were formed about 1.8 billion years ago. The weathered sandstone and limestone rocks from the Funeral and Panamint Mountains are much younger, about 500 million years old, and indicate that this area was the site of a warm, shallow sea throughout most of the Paleozoic Era (570–250 million years ago).

About 3 million years ago, the dynamics of crustal movement changed, and Death Valley proper began to form. At this time, compressional forces were replaced by extensional forces. This “pulling apart” of the earth's crust allowed large blocks of land to slowly slide past one another along faults, forming alternating valleys and mountain ranges. Badwater Basin, the Death Valley salt pan, and the Panamint Mountain Range comprise one block that is rotating eastward as a structural unit. The valley floor has been steadily slipping downward, subsiding along the fault that lies at the base of the Black Mountains. Down-dropping continues today.

Concurrent with the subsidence, has been slow but continuous erosion. Water carries rocks, sand, and gravel down from surrounding hills and deposits the pieces on the valley floor. Beneath Badwater lies over 9,000 feet of accumulated sediments and salts.

Recent signs of volcanic activity exist in the northern third of the park at Ubehebe Crater. Caused by violent steam explosions, the craters formed several thousand years ago when molten material came in contact with groundwater.

There are five dune areas within the park. They are located near Saratoga Springs, Stovepipe Wells, Panamint Springs, Saline Valley, and Eureka Valley. “[The Eureka Valley Dunes are] the highest dunes in the Basin and Range Province and possibly in the

United States. When observed at sunset from the west, against the backdrop of the Last Chance Range, its nearly vertical west facing slopes resemble a marvelous parfait-like melange of pink, white and numerous other tones of earth colored rocks” (BLM 1982).

## **BIOLOGICAL RESOURCES**

### **VEGETATION AND WILDLIFE**

#### **Exotic Species**

Exotic species can include both plants and animals. They are generally defined as those species that occur in a given place as a result of direct or indirect, deliberate, or accidental actions by humans. The exotic species introduced because of such human action would not have evolved with the species native to the place in question and, therefore, would not be a natural component of the ecological system characteristic of that place. Examples of exotic species in the park include wildlife such as burros and chukar and plants like tamarisk and Russian thistle.

#### **Vegetation**

Tamarisk, Russian thistle, some palms, introduced annual grasses (from Europe and Asia), and hornwort are some of the more pernicious exotics in the park. These species often outcompete native vegetation, subsequently eliminating or displacing natives and associated native animals. Annual plants, such as introduced grasses and Russian thistle, often provide an unnatural increase in the amount of dried material available as wildfire fuel.

The tamarisk (*Tamarix ramosissima*), or salt cedar, an introduced shrub or small tree, 5 to 20 feet tall, is an opportunistic invader of moist areas. There are many areas in the park where this plant has choked out native vegetation. Both the Bureau of Land Management and the National Park Service have ongoing control programs that are attempting to manage this invasive plant. Continuing control is needed to prevent this weedy tree from outcompeting and eliminating native vegetation. A larger relative, the athel (*T. Aphylla*), has been planted, typically as a windbreak or sand-break, in a number of locations in the park (e.g. near Furnace Creek, Death Valley Junction, and Shoshone). Although not as invasive as tamarisk, the athel is also believed to be an invader of native habitats. Death Valley National Park is reducing the potential for reintroduction by encouraging the use of other types of shade trees, landscaping, and windbreak plantings in developed areas within and outside the park.

Russian thistle (commonly called tumbleweed) is common in many disturbed portions of the park, including the Eureka Dunes area, approximately 300 acres near Harrisburg Flats at Skidoo, other old mining sites, and along roadsides.

Date and Washington palms have become established at several backcountry springs in Death Valley National Park. These palms may be removed if it is determined that they are not part of the historical scene.

Introduced annual grasses, such as *Bromus* and *Schismus* species, are serious pests when mature (Hitchcock and Chase 1971). “The narrow, sharp-pointed minutely barbed florets (or fruits) with their long rough awns work into the eyes, nostrils, and mouths of stock, causing inflammation and offer serious injury”( Hitchcock and Chase 1971). The increase of these grasses throughout much of the arid west is believed to be an important contributing factor in the increase in desert wildfires, which used to be uncommon.

Hornwort, an aquatic annual plant with dense growth, is being removed from Saratoga Spring near the southeast boundary of the park (NPS 1988a).

### **Animals**

***Aquatics.*** Death Valley National Park has a number of aquatic exotic species. Mosquito fish, goldfish, crayfish, and bullfrogs are common in the Saline Valley. Mosquito fish are also found at Furnace Creek and goldfish are found at China Garden Spring. Other than the knowledge of their presence, little is known about the effects of these species on the native fauna and flora.

***Chukar.*** The Chukar (*Alectoris graeca*) an upland game bird, popular among hunters, that was first introduced into California (from India) in 1932 (Mallette c. 1970). Between 1932 and 1955, over 52,000 birds were released by the California Department of Fish and Game (Mallette c. 1970). The birds prefer rocky open hills and flats. Sightings have been reported from below sea level to above 12,000 feet in the White Mountains and Sierra Nevada. The animal is abundant in every valley and mountain range in Death Valley National Park.

***Burros and Wild Horses.*** Burros were used in the Southwest between 1530s, when the Spanish explorers first brought them to North America, until the 1850s, when the discovery of gold in California led to the burro becoming the prospector’s principal means of transportation (Douglas and Leslie 1996). When mines played out or when motorized vehicles became the more practical mode of transport, the miners’ burros were often released into the wild (NPS 1979).

From about 1920 to the 1960s, burro populations were kept at low levels by government agencies like the National Park Service and by the public by organized and random shooting of the burros. These efforts to reduce or eliminate feral burros from national park lands were park managers’ response to the burros damaging park resources and changing the ecological composition at the expense of the park’s native biotic communities.

Ecological niches to which Pleistocene equids related do not exist today, and no other animals in the contemporary North American fauna would have the same niche relationships as the modern-day equids, with or without the latter's presence (NRC 1982).

In the 1950s the states of Arizona and California passed burro protection laws that limited the killing of these animals by private citizens. In the late 1960s, Grand Canyon National Park was prevented by public outcry from continuing the 40-year custom of shooting burros (NPS 1979). In 1971 the Federal Wild Free-Roaming Horse and Burro Act was passed. This act limited the killing of horses and burros on public lands administered by the Bureau of Land Management and the U.S. Forest Service. This law does not apply to NPS lands.

Before the passage of the California Desert Protection Act wild horse numbers were few to none within California desert national park units. Presently, the wild horse numbers within NPS units are low, about 10–20 animals. However, numbers are high in the four BLM herd management areas (HMAs) that are adjacent to Death Valley National Park. In these herd management areas, there are about 305 wild horses (BLM 1995b).

Before the passage of the California Desert Protection Act, the Bureau of Land Management managed 13 herd management areas (HMAs) in the California Desert District. Now the agency manages nine herd management areas, with four former herd management areas now within areas managed by the National Park Service. Of the Bureau of Land Management's remaining nine HMAs, four are outside the NEMO planning area. The National Park Service agreed to manage new park lands to existing BLM authorized herd management levels until management plans were in place. These management levels are 334 burros and 9 wild horses for Death Valley. The existing burro population levels for the new lands added to Death Valley National Park greatly exceed the BLM herd management levels.

**TABLE 1: BLM'S WILD HORSE AND BURRO HERD MANAGEMENT AREAS FOR HERDS ADJACENT TO DEATH VALLEY NATIONAL PARK**

<b>Herd Management Areas (HMA)</b>	<b>BLM's Herd Management Levels (revised*)</b>	<b>BLM's October 1996 Population Estimate**</b>
Piper	82 burros and 17 horses	5 burros and 54 horses
Lee Flat	9 burros (70%)*	60 burros
Centennial	0 burros and 160 horses (5%)	116 burros and 280 horses
Chicago Valley	27 burros and 27 horses (5%)	6 burros and 9 horses
<b>Total</b>	118 burros and 204 horses	187 burros and 343 horses

\* Herd numbers are adjusted to correspond with decrease in herd management area boundaries due to added lands to Death Valley National Park. For example, about 70 % of the Lee Flat HMA is now within Death Valley National Park; therefore 30% of the former herd size (30 animals) equals the revised BLM herd management level, nine animals in this case (.30 x 30 = 9).

\*\* BLM estimates includes animals on BLM and on adjacent NPS lands.

\*\*\* Actual percentage of HMA now within Death Valley National Park.

**TABLE 2: BURRO AND WILD HORSE POPULATION DATA**

	<b>Horses</b>	<b>Burros</b>
BLM's desertwide pre-CDPA herd management levels	267	843
Post-CDPA herd management levels (does not include burros and horses on NPS land)	247	307
Actual estimated California desert population*	411	2,343

\* BLM 1996 population estimates

Nevada's BLM Las Vegas Field Office has two herd management areas adjacent to the park, Amargosa and Ash Meadows herd management areas. Both are south of Lathrop Wells, Nevada, and both presently have zero animals and have management levels of zero animals. Other herd management areas within this resource area are at least 6 miles from the stateline. The Bureau of Land Management's policy is to remove all burros outside of their herd management areas. The Tonopah Resource Area has three herd management areas adjacent to the park. Bull Frog burro HMA, near Beatty, Nevada, has a recommended management level of 53 burros; Gold Mountain burro HMA, between Gold Point and Scotty's Junction, Nevada, has a management level of zero burros and 50 horses; and Palmetto horse HMA west of Lida, Nevada, which has a management level of 76 horses (BLM 1997). It was reported that about 50 burros exist in the northern portion of Fort Irwin near the Leach Lake area (Steve Ahmann, pers. comm., 1996).

Units of the national park system must be managed under the mandates of the Organic Act of 1916 (16 U.S.C. 1), the 1970 Act for Administration as amended by the 1978 Redwood National Park Expansion Act (16 U.S.C. 1a-1) and the NPS *Management Policies* (1988). The Endangered Species Act requires that actions by federal agencies do not jeopardize the continued existence of endangered or threatened species or result in adverse modification or destruction of their habitat. It should be reemphasized that the Federal Wild Free-Roaming Horse and Burro Act is not applicable to NPS administered lands (*Kleppe v. New Mexico*, 426 U.S. 529, 49 L. Ed. 34, 96S. Ct. 2285 (1976)).

Death Valley National Monument was established in 1933. In 1938 there were an estimated 1,500 burros in the monument, occurring in both the Panamint Range on the west and the Amargosa Range on the east side of Death Valley. Burro reduction had started on a limited scale in 1939 and was carried on more extensively between 1958 and 1967. By 1967, 3,570 burros had been removed from the population: 1,790 by live trapping and removal, and 1,780 by direct reduction (shooting). In 1968, due to public sentiment, shooting was discontinued. Although all burros have been removed from the east side of the monument, by fall of 1970, there were an estimated 1,350 in the Panamint Range.

In 1973 the park staff again began live trapping and shooting burros. About 400 burros were shot before discontinuing the practice in 1978.

Death Valley prepared an environmental impact statement in September 1977, which included 20 options for removal of burros. The Death Valley plan meshed with the interim management plans of the BLM's Bakersfield District, both of which supported NPS policies of removal of exotic species from units of the national park system. A cooperative agreement regarding burro management was drawn up among the Bureau of Land Management, the National Park Service, and China Lake Naval Weapons Center.

The approved plan was conducted in three phases:

Phase one: Death Valley National Monument's capture and adoption – Remove all burros through live trapping over a three-year period, turning the burros over to animal protection groups to place in adoptions, live; and to construct 35 miles of fence in Nevada to exclude burros and cows. (In the Nevada triangle portion of the old monument cattle were as severe a problem as were burros).

Phase two: animal protection groups remove stragglers over a one year period.

Phase three: zero population – go to direct reduction – shooting any remaining burros, to approach a zero population.

An agreement (to conduct the roundups) was made with the Bureau of Land Management and with the animal protection groups. The agreement was signed on July 2, 1982. The three-year roundup began in October 1983. Phase one ended in April 1986, removing alive nearly 6,000 burros. (The 1981 census was 2,501 burros). The government's cost was \$1.7

million. Animal protection groups agreed to take all burros captured out for adoption, but took only 60%.

During phase two from fall 1986 to winter of 1987, 230 burros were removed by animal protection groups. Phase three began on July 1, 1987 and will continue as long as necessary within the old monument boundary.

On February 28, 1995, the superintendents of Death Valley National Park and Mojave National Preserve agreed to an interim management policy for burros on lands formerly managed by the Bureau of Land Management. The policy is to maintain the BLM-approved management levels until a final decision is derived through the formal planning process, which includes the preparation and public review of this document. That level is 297 burros and 9 wild horses for Death Valley National Park and 130 burros for Mojave National Preserve.

The National Park Service estimates that at least 110 burros from Death Valley National Park and 1,100 burros in Mojave National Preserve need to be removed to reach the BLM-approved management levels. Under this interim policy all wild horses and burros removed would be captured and made available for adoption to the public.

In Death Valley National Park the total wild horse and burro populations are about a dozen horses and 350-550 burros. The park's Nevada triangle boundary, and its southern boundary near Owlshead Mountains are its only areas where there is no adjacent BLM herd management area.

Death Valley National Park is still managing its burros for its former monument boundary under a management strategy developed when it was a national monument. In 1995 a volunteer burro protection group began removing burros via live capture in lieu of the park's removal policy. The park has not abandoned its existing plans for burro removal within the old monument boundary, but has suspended its own removal plans while the volunteer group's efforts are underway. This group has removed about 20-30 burros per year. This volunteer operation has been at minimal cost to the federal government, however, it is questionable whether this removal level is helping to reduce the numbers toward zero.

Since many of the herd management areas are adjacent to National Park Service lands, this plan will consider options, developed with Bureau of Land Management and National Park Service interagency cooperation for wild horse and burro management within both NPS units and BLM lands.

## **SPECIES AND HABITATS OF SPECIAL CONSIDERATION**

Within Death Valley National Park, there are confirmed populations or viable habitat for six federally endangered, one federally threatened, two federally proposed-for-listing, four state endangered, four state threatened, and four state rare plants and animals (see appendix C).

Federally listed species in Death Valley include: desert tortoise (*Gopherus agassizii*), Devils Hole pupfish (*Cyprinodon diabolis*), southwestern willow flycatcher (*Empidonax traillii extimus*), least Bells vireo (*Vireo bellii pusillus*), Eureka Dunes evening primrose (*Oenothera californica* ssp. *eurekensis*), Eureka Valley dunegrass (*Swallenia alexandrae*), and spring-loving centaury (*Centaureum namophilum*).

Federally listed species for which final recovery plans exist are desert tortoise, Devils Hole pupfish, Eureka Dunes evening primrose, and Eureka Valley dunegrass. A draft recovery plan is in development for the least Bell's vireo with a subsequent final plan scheduled for public release in the summer or fall of 1998 (Benz personal communication, 1997).

Federally proposed listed species are: shining milk-vetch (*Astragalus lentiginosus* var. *micans*) and Sodaville milk-vetch (*Astragalus lentiginosus sesquimetalis*).

California listed species, other than those also federally listed or proposed, are: California (or western) yellow billed cuckoo (*Coccyzus americanus occidentalis*), willow flycatcher (*Empidonax traillii*), Cottonball Marsh pupfish (*Cyprinodon salinus milleri*), and Mohave ground squirrel (*Spermophilus mohavensis*).

California rare plant species, not otherwise federally listed or proposed, are: July gold (*Dedeckera eurekensis*), and rock lady (*Maurandya petrophila*).

The species detailed in the text below are: Federally endangered (FE), Federally threatened (FT), Federally proposed threatened (FPT), California Endangered (CAE), California threatened (CAT), or California Rare (CA Rare), Nevada Critically Endangered (NVCE), or Nevada threatened (NVT).

### **Desert Tortoise (*Gopherus agassizii*) – FT, CAT**

The range of the desert tortoise includes the Mojave and Sonoran deserts in southern California, Arizona, southern Nevada, the southwestern tip of Utah, and Sonora and northern Sinaloa, Mexico. The Mojave population of the desert tortoise (an administrative designation for animals living north and west of the Colorado River) is listed as a threatened species by the Federal government and the state of California. Critical habitat for this species was designated in 1994 (FWS 1994). There is no desert tortoise designated critical habitat within Death Valley National Park. The desert tortoise's range within Death Valley National Park extends to its southern half. Within the park the current populations (and for at least the last 60 years, are not believed to be very numerous.



The Mojave population of the desert tortoise occurs primarily in valleys and on bajadas characterized by scattered shrubs. The soils range from sand to sandy-gravel, though caliche soils, desert pavement, and rocky, boulder terrain are occasionally used. Desert tortoises spend a large portion of the year underground to avoid extreme temperatures and, for younger tortoises, to avoid a variety of predators, such as coyotes, foxes, raptors, and ravens (BLM 1996). Tortoises are active during the spring, early summer, and autumn when annual plants are most common and daily temperatures are tolerable. Additional activity occasionally occurs during warm weather in winter months and after summer rainstorms (BLM 1996).

### **Species Addressed in the Ash Meadows Recovery Plan**

Devils Hole Pupfish (*Cyprinodon diabolis*) – FE, NVCE  
spring-loving centaury (*Centaurium namophilum namophilum*) – FT, NVCE  
Ash Meadows sunray (*Enceliopsis nudicaulis* var. *corrugata*) – FT, NVCE  
Ash Meadows gumplant (*Grindelia fraxino-pratensis*) – FT, Nevada Watch List

Devils Hole is a small tract of land administered by Death Valley National Park while part of a larger spring complex in Nevada called Ash Meadows. Devils Hole falls within the boundaries of Ash Meadows National Wildlife Refuge. A limestone cave at Devils Hole, bearing the same name, is the only natural habitat of the Devils Hole pupfish, listed as endangered by the federal government and state of Nevada. The underground aquifer determines the cave's water level which has no surface outlet. Historic and ongoing mining of groundwater in Ash Meadows has occasionally directly lowered the water level in Devils Hole, occasionally exposing a shallow limestone shelf on which the pupfish depend for food and spawning (Soltz and Naiman 1978; E.P. Pister, pers. comm., 1997).

Decline of the Devils Hole pupfish drove litigation resulting in a U.S. Supreme Court ruling upholding the maintenance of a minimum water level at the cave. From 1980 to at least 1990, the population status was upward but "persistently small and localized." The species is considered not delistable; criteria for its protection are the maintenance of water levels and water chemistry. Other species of special consideration located at the limestone cave or at springs within the 40 acres are: Devils Hole warm springs riffle beetle, Amargosa tryonia snail (*Tryonia variegata*), (FWS 1990). Water levels are currently monitored by the National Park Service. The combined records from water level monitoring by the National Park Service and the U.S. Geological Survey dating from the 1960s demonstrated a maximum level of recovery in 1989; thereafter, a downward trend has persisted.

The 1990 FWS recovery plan for listed species of Ash Meadows embraced goals of the 1980 recovery plan for the Devils Hole pupfish and addressed the following federally listed species located at Ash Meadows, Nevada, and on National Park Service or BLM-managed areas within adjacent lands in California:

spring-loving centaury (*Centaurium namophilum namophilum*)

Ash Meadows sunray (*Enceliopsis nudicaulis* var. *corrugata*)  
Ash Meadows gumplant (*Grindelia fraxino-pratensis*).

Also noted were Ash Meadows endemics including, but not limited to the following:

Listed species

Warm Springs pupfish (*Cyprinodon nevadensis pectoralis*)  
Ash Meadows Amargosa pupfish (*Cyprinodon nevadensis mionectes*)  
Ash Meadows speckled dace (*Rhinichthys osculus nevadensis*)  
Ash Meadows naucorid (*Ambrysus amargosus*)  
Ash Meadows blazing star (*Mentzelia leucophylla*)  
Ash Meadows ivesia (*Ivesia eremica*)  
Ash Meadows milk-vetch (*Astragalus phoenix*)

Other species of concern

Ash Meadows montane vole  
white-faced ibis  
Amargosa naucorid bug  
a host of spring snails (including Amargosa tryonia)  
alkali mariposa lily (*Calochortus striatus*)  
Tecopa bird's beak.

Not all of the above-referenced species are directly addressable herein because they are not found on lands within the planning area; they do, however, merit mention due to a common regional water drawdown threat and potential benefits of regional monitoring and conservation. Decline of the listed species at Ash Meadows has been attributed to ground water removal, presence of exotic species and habitat alteration.

The Ash Meadows recovery plan describes “essential habitat” for the Devils Hole and Warm Springs pupfish (the latter found only in close proximity to Devils Hole) and critical habitat as designated for the following plants and animals:

Amargosa niterwort	Ash Meadows speckled dace
spring-loving centaury	Ash Meadows naucorid
Ash Meadows sunray	Ash Meadows blazing star
Ash Meadows gumplant	Ash Meadows ivesia
Ash Meadows Amargosa pupfish	Ash Meadows milk-vetch

Essential habitat for the Devils Hole pupfish includes “21,760 acres encompassing the area where groundwater removal most influences the water level in Devils Hole.”

Although the 1989 *General Management Plan* for Death Valley National Monument called for a transfer of management for Devils Hole to the U.S. Fish and Wildlife Service, this plan and the recovery plan recommends that the National Park Service retain legal

responsibility for the 40 acres under its jurisdiction.

Amargosa pupfish and speckled dace, Amargosa niterwort, spring loving centaury, Ash Meadows sunray, Ash Meadows gumplant, alkali mariposa lily, Tecopa bird's beak, and white bear poppy range into California at locations along the Amargosa drainage and at various sites supporting stream, spring, salt marsh, moist alkaline soil, calcareous, or riparian habitats.

### **Riparian-Dependent Bird Species**

southwestern willow flycatcher (*Empidonax trailli extimus*)-FE, sp. level CAE  
least Bells vireo (*Vireo bellii pusillus*)-FE  
California/western yellow-billed cuckoo (*Coccyzus americanus occidentalis*)-CAE

Mesic habitats in the planning area are not noted for high numbers of the riparian obligates listed above (relative to their known ranges), but such habitats do provide a degree of essential foraging and nesting habitat. To date, other than along the Colorado River, the study of the vireo and flycatcher in the desert have been concentrated along the Mojave River. Small numbers of all three species have been confirmed along the Amargosa River and in Death Valley.

In May 1986, *Vireo bellii pusillus* was federally listed. Its critical habitat was designated in February 1994. Endangered status took effect for *Empidonax trailli extimus* in March 1995, and a final determination of critical habitat was made in July 1997. Listing of the willow flycatcher by the state of California is at the species level. Federal recovery planning is underway for both the vireo and flycatcher. There is no critical habitat located within Death Valley National Park for either subspecies.

The western yellow-billed cuckoo, state endangered since 1988, generally requires a broader stand of riparian growth than the vireo or flycatcher, although loss of riparian habitat is the major common factor influencing the decline of all. The cuckoo does not appear to be affected by brood parasitism by the brown-headed cowbird (*Molothrus ater*) as is a severe problem for the vireo and flycatcher. In this behavior, cowbirds introduce their offspring to the nest and care of a host bird species, competing directly with the success of the host's young and sometimes eating or ejecting the host's eggs. (Thelander 1994).

### **Species Addressed in the Eureka Valley Dunes Recovery Plan**

Eureka Valley evening primrose (*Oenothera californica* ssp. *eurekensis*) – FE  
Eureka Valley dunegrass (*Swallenia alexandrae*) – FE  
shining milk-vetch (*Astragalus lentiginosus* var. *micans*) – FPT  
Sodaville milk-vetch (*Astragalus lentiginosus sesquimetralis*) – FPT, CAE, NVCE

Prior to the administrative transfer to the National Park Service in 1994, the Bureau of Land Management established the Eureka Valley area of critical environmental concern and in 1982, the U.S. Fish and Wildlife Service adopted the *Eureka Valley Dunes Recovery Plan*. Stemming from these, by draft agreement, a voluntary joint conservation strategy is being developed by the U.S. Fish and Wildlife Service and Death Valley National Park to protect sites where there are four federally listed and proposed plants. The agreement targets actions over entire dune ecosystems to benefit these plants and other species of special consideration including endemic beetles. Two federally endangered species, Eureka Valley evening primrose (*Oenothera californica* ssp. *eurekensis*) and Eureka Valley dunegrass (*Swallenia alexandrae*), and a Federally proposed threatened species, shining milk-vetch (*Astragalus lentiginosus* var. *micans*), are only found on dunes within Death Valley National Park. Additionally, the California population of another federally proposed threatened species, Sodaville milk-vetch (*Astragalus lentiginosus sesquimetralis*), is located at the park (Diane Steeck, pers. comm., 1997).

The largest population of Eureka Valley dunegrass is found on high, unstable areas of Eureka Dunes, with remaining known stands located in smaller dunes on the west side of Eureka Valley. The major occurrence of Eureka Valley evening-primrose is at Eureka Dunes, but this species is also known from two smaller sites on the west side of Eureka Valley, growing on lower slopes and dune flats. Eureka Dunes and one site on the western Eureka Valley comprise the known range of shining milk-vetch, which grows on mid- and lower-dune slopes and some sandy flats. Sodaville milk-vetch has been found at Death Valley National Park and at two sites in Nevada; it relies on margins of alkaline wetlands, near cool springs (Diane Steeck, pers. comm., 1997).

Notable recolonization of shining milk-vetch has occurred in areas where motorized vehicle use is no longer authorized, but concerns remain with occasional motorcycle and other vehicle trespass, vandalism to barriers and signs and other human uses, including sandboarding/skiing and horseback riding. Possible encroachment and competition with the mid- and lower-dune endemics by the nonnative Russian thistle (*Salsola* sp.) is another concern. It is believed that the most persistent threat to the Sodaville milk-vetch population at Big Sand Spring has been habitat trampling and modification by burros and cattle (Diane Steeck, pers. comm., 1997). This area has been fence by the park to protect the plants.

### **Other Death Valley National Park Rare Plants**

July gold (*Dedeckera eurekensis*) – CA Rare  
rock lady (*Maurandya petrophila*) – CA Rare

The July gold (*Dedeckera eurekensis*) and rock lady (*Maurandya petrophila*) grow only in areas containing carbonate soils.

### **Cottonball Marsh pupfish (*Cyprinodon salinus milleri*) – CAT**

This killifish subspecies is found only in Death Valley, in “portions of Cottonball Marsh on the west side of the central valley floor approximately 5 miles south of Salt Creek” (*Death Valley National Monument Draft General Management Plan* 1988). Threats to its survival include direct and indirect habitat alteration from changes to water levels, quality, and/or chemistry. An overall concern with regional water diversion is not limited to this species, rather, has the potential to affect a large number of sensitive aquatic species (including insects and snails) and riparian obligates.

### **Mohave ground squirrel (*Spermophilus mohavensis*) – CAT**

The only known occurrence of the Mohave ground squirrel in the planning area is at Lee Flat, in Death Valley National Park. This represents the northernmost extension of the squirrel’s range, which is limited to the northwestern Mojave Desert. No records exist of traditional or current presence of the squirrel in Panamint Valley nor Saline Valley (Leitner, pers. comm. 1997).

Although previously found in a variety of vegetation associations to 5,600 feet elevation, the species seems to “prefer large alluvial-filled valleys and deep, fine-to-medium textured soils vegetated with creosote bush scrub, shadscale scrub, or alkali sink scrub wherever desert pavement is absent” (FWS 1995a). Winterfat (*Krascheninnikovia lanata*) and spiny hopsage (*Grayia spinosa*) are important dietary components; the squirrel favors forbs in wet years and winterfat in dry years. Diets of domestic sheep more closely overlap that of the Mohave ground squirrel than do those of cattle or feral burros (Leitner, pers. comm. 1997).

The species’ state threatened status is based on habitat loss due to agriculture, recreational, and military vehicle use. In 1995, the U.S. Fish and Wildlife Service reviewed a petition to list the species as federally threatened and while advising continued monitoring for impacts due to habitat degradation/ fragmentation and drought, determined a lack of sufficient information to warrant a status review (FWS 1995b; FWS 1995c). Substantial new information is still lacking about recent trends in squirrel populations, historic occupied range, current habitat, and vulnerability of key populations (Gustafson, pers. comm. 1997).

### **SPECIES RESTORATION**

The National Park Service’s policy is to strive to restore native species to parks. See “Alternatives” section for details on restoration policies and programs. Such programs will be carried out in cooperation with other affected agencies, organizations, and individuals.

Any necessary confinement of animals in small fenced areas during restoration efforts will continue only until the animals have become thoroughly accustomed to the new area or they have become sufficiently established to minimize threats from predators, poaching, disease, or other factors (NPS 1988).



# CULTURAL RESOURCES

## ARCHEOLOGICAL RESOURCES

Various cultural resource studies have examined archeological resources in the Death Valley National Park area. The most significant studies are: Hunt, *Archeology of Death Valley Salt Pan* (1960); Wallace, *Death Valley National Monument's Prehistoric Past: An Archaeological Overview* (1977); Davis, Brown, and Nichols, *Evaluation of Early Human Activities and Remains in the California Desert* (1980); Warren, Knack, and Warren, *A Cultural Resource Overview for the Amargosa-Mojave Basin Planning Units* (1980); Norwood and Bull, *A Cultural Resource Overview of the Eureka, Saline, Panamint and Darwin Region, East Central California* (1980); Brooks, Wilson, and Brooks, *An Archaeological Inventory Report of the Owlshead/Amargosa-Mojave Basin Planning Units of the Southern California Desert Area* (1981); and Fowler, Dufort, Rusco, and the Historic Preservation Committee, Timbisha Shoshone Tribe, *Residence Without Reservation: Ethnographic Overview and Traditional Land Use Study, Timbisha Shoshone, Death Valley National Park, California* (1995).

### **PLEISTOCENE ERA**

During the Pleistocene Era, a period that witnessed a cool, moist climate south of the continental ice sheets, these rivers formed an integrated drainage system, along with several extensive lakes, including Lake Mojave, that ultimately drained into Death Valley, forming pluvial Lake Manly. Evidence of human occupation during the Pleistocene Era remains a controversial subject.

### **LAKE MOJAVE PERIOD, 10,000-5000 B.C.**

Claims have been made for archeological assemblages dating to times earlier than the Lake Mojave period, but all are debatable and have little or no known relationship to later cultural developments in the Mojave Desert. However, the Lake Mojave complex, which is considered to be a Paleo-Indian assemblage by most archeologists, is also thought to be ancestral to the early Archaic cultures of the Pinto period.

Sites of the Lake Mojave period are nearly always limited to the surface, and it is possible that two or more assemblages are represented at some of these sites. Many of the sites are associated with shoreline features of Pleistocene lakes, such as the shorelines of extinct Lakes Mojave and Manly, and near springs. While some scholars have postulated that the cultural assemblages of the Lake Mojave period were the remains of a widespread generalized hunting adaptation in pursuit of large mammals, others have argued that they are associated with a more specialized adaptation to lacustrine resources of the pluvial lakes or with a more generalized hunting and collecting economy for this

early population in which the lakeside sites represented a “marsh orientation” during a portion of the seasonal round.

### **PINTO PERIOD, 5000–2000 B.C.**

Dramatic environmental changes came to the Mojave Desert with the end of the Pleistocene Era, characterized by harsh climatic conditions with higher temperatures and lower precipitation. Lakes and rivers dried up, and resources available were much reduced. Human adaptation to these new environmental conditions appears to be represented by the Pinto period assemblages.

The Pinto sites are most often limited to surface manifestation or have poorly developed middens with relatively low artifact density. They appear to be seasonal camps by small groups of highly mobile people. The small number of Pinto period sites, together with their apparent temporary occupation of hunting large and small game and collecting vegetable resources, suggests that the population was sparse and poorly adapted to the increasingly arid conditions of the desert environment. During particularly arid periods, they probably withdrew to the margins of the desert and to perennial springs and microenvironments less affected by the overall climatic deterioration, and during more moist periods they likely expanded their territory in the lower desert areas to take advantage of the shallow lakes, marshes, and springs. During the later part of the Pinto period, when the Mojave Desert was at its most arid, the population of the Mojave Desert seems to have decreased, although a mosaic of microenvironments permitted localized habitation throughout the desert.

### **GYPSUM PERIOD, 2000 B.C.–A.D. 500**

The beginning of the Gypsum period coincided with the commencement of a more moist climatic era, often referred to as the Little Pluvial, about 2000 B.C. The Gypsum period was a time of intensive occupation of the desert, coupled with a broadening of economic activities and increasing contact with the California coast and Southwest. The bow and arrow was introduced late in this period, making hunting more efficient. The split-twig figurines and Coso Range petroglyphs, located just outside the planning area, suggest the existence of a rich ritual life.

Although hunting continued to be an important economic pursuit during the Gypsum period, milling stones and handstones became common during this period, indicating increased use of plant foods and reliance on hard seeds. Mortars and pestles and manos and metates are reported at Mesquite Flat in Death Valley and on the Amargosa River, where they dated between 2080 and 3250 B.C. These sites are located near or in mesquite groves, suggesting that the processing of mesquite pods with the mortar and pestle may have become an important element in the subsistence system.



Generally, the Gypsum period was a time in which the Mojave Desert population incorporated new technological items and ritual activities and increased socioeconomic ties through trade. Because of these new means of adaptation, the return of arid conditions toward the end of the Gypsum period had relatively little effect on the Mojave Desert's population density and distribution.

### **SARATOGA SPRINGS PERIOD, A.D. 500–1200**

During this period, large village sites, such as Saratoga Springs in Death Valley, were developed. The settlement pattern in these places appears to have shifted from a circulating pattern of temporary camps to one with more specialized camps radiating outward from the larger habitation sites.

In the northern Mojave, from Death Valley to the Sierra Nevada, the sites of the Saratoga Springs period appear to exhibit cultural continuity with the Gypsum period being most apparent the reduction in size of projectile points as a result of the introduction of the bow and arrow. Changes in subsistence systems cannot be adequately identified, but reduction in mammal hunting, such as deer, in the northern Mojave may be postulated. During the Saratoga Springs period, there appears to be a refinement of adaptation to the arid environment of the northwest Mojave, and presumably the beginnings of the eastward expansion across the Mojave of Numic-speaking groups, who were the ancestors of the historic Shoshone and Paiute who inhabited the eastern California desert region at the time of Euro-American contact.

Essentially, the same assemblage was present across the Mojave Desert north of the Mojave River. However, Basketmaker-Pueblo influences increased with Anasazi occupation of the lower Virgin and Muddy Rivers. Research suggests that the Anasazi controlled turquoise mines near Halloran Spring in the east-central Mojave between about A.D. 700 and 900, followed by Hakataya peoples who withdrew about A.D. 1200–1300. Finally, the Southern Paiute utilized the area in late prehistoric times. The mining of turquoise resulted in Anasazi influence in much of the eastern Mojave, because small parties of these Virgin and Muddy River villagers used the region for intermittent and seasonal foraging. The extent of these forays has not been determined, but it appears to have been considerable, particularly in well-watered areas such as Las Vegas Valley, Ash Meadows, and the Spring Mountains. The area of this influence can be mapped by the distribution of Anasazi sherds occurring in considerable frequency at sites in southern Nevada and in California as far west as the Cronise Basin, west of Soda Lake. Anasazi influence set the eastern Mojave apart from the remainder of the desert.

## **SHOSHONEAN PERIOD, 1200 A.D.–EURO-AMERICAN CONTACT**

The Shoshonean period clearly anticipates the historic Native Americans with evidence of bow and arrow hunting, exploitation of plant resources using milling stones, and use of circular houses. The Anasazi influence faded after A.D. 1200 as a result of changes in climatic conditions, population movements, settlement patterns, social organization, and trade alignments.

This northern Mojave assemblage extended from Owens Valley on the west to the Valley of Fire on the east, and is represented by the Indian Ranch site and Coville Rockshelter in Panamint Valley, a variety of sites in Death Valley, and the China Ranch site and the Shoshone Rockshelter in the Amargosa Valley.

## **HISTORIC ARCHEOLOGY**

Historic archeological sites in the park are largely associated with transportation corridors, water sources, and mining operations during the late 19<sup>th</sup> and early 20<sup>th</sup> centuries.

## **STATUS OF ARCHEOLOGICAL RESEARCH**

Although it is estimated that only about 6 percent of the lands within the boundaries of pre-1994 Death Valley National Monument (and an even smaller proportion of the lands added to the monument in 1994) have been surveyed for archeological resources, the overall cultural sequence is well documented. In particular, the archeological research and survey efforts of Hunt and Wallace, conducted primarily during the 1950s and 1960s, have formed the bulk of extant data about prehistoric native cultures. Nearly 2,000 archeological sites, covering some 10,000 years of human activity, have been identified. Archeological sites include house circles; habitation areas; complex sites; rockshelters; campsites; workshops; quarries and lithic scatters; hunting blinds; plant food processing stations; storage pits; cemetery and burial areas; rock art (petroglyphs/pictographs); rock alignments; and rock traps or caches. Areas of particular archeological significance within the park boundaries include Butte Valley, Mesquite Flat, the floor of Death Valley, Grapevine Canyon, high elevation localities in the Panamint Mountains, alluvial fans on the west side of Death Valley, and springs.

More recent archeological survey has been driven by compliance actions and salvage operations related to park development plans. These efforts, although more up-to-date in terms of professional scientific standards, have sometimes lacked a cohesive research design which would tie them to larger issues of a parkwide or desert-wide nature. As a result, past researchers have often been forced to treat individual sites in different portions of Death Valley as culturally distinct entities, resulting in sometimes confused cultural sequential chronologies.

At present, the National Park Service is undertaking a three-year systematic, parkwide archeological survey of at-risk areas under a cooperative agreement with the University of California, Riverside.

### **LANDFORMS AND ARCHEOLOGICAL RESOURCES**

While archeological sites are found on virtually every type of landform in the park, the persistent association of certain features with archeological sites allows for fairly reliable estimates about the types of landforms that are likely to support sites. Proximity to fresh water and food resources are the primary variables influencing Native American site location. For example, a spring in or near a mesquite grove would be an optimal location for a site. An alluvial fan generally lacks resources and would not have been a primary occupation or food collecting and processing site, but may have been the location of food storage facilities or a temporary campsite, trail, burial site, or rock art site, all of which fall outside of the parameters of a model based solely on subsistence variables.

However, previous environmental conditions must also be considered. Ancient late Pleistocene Era/early Lake Mojave Period beach features associated with now-extinct lacustrine and riparian habitat were prime occupation or food collecting and processing sites over 6,000 years ago, in spite of what the present landscape may look like.

Euro-American sites, while generally more easily identified than prehistoric sites, are generally associated with transportation networks and resource procurement/exploitation features. In the park, transportation routes, water sources, and mining operations are prime locations where such archeological sites may be found. The network of interconnecting roads is usually preserved and is easily discernible from aerial photographs and early maps.

### **NATIONAL REGISTER OF HISTORIC PLACES**

No prehistoric archeological sites or districts within the park boundaries are listed on or have been determined eligible for listing on the National Register of Historic Places.

Draft National Register nomination forms for archeological districts in the national park that have been prepared include: Butte Valley, Mesquite Spring, Racetrack-Goldbelt, Ubehebe Crater, Upper Emigrant, Upper Panamint, Death Valley Salt Pan, Furnace Creek, Mesquite Flat, Grapevine Canyon, Ibex Spring, Keane Wonder Mine, Saratoga Springs, and Lower Vine Ranch.

The National Park Service is planning to prepare National Register nomination forms for archeological districts such as Furnace Creek Wash, Saline Valley, and Eureka Valley.

## HISTORIC RESOURCES

Various cultural resource studies and publications have examined historic resources in Death Valley National Park. The most significant studies and publications are: Levy, *Death Valley National Monument Historical Background Study* (1969); Evans, Taylor, and Rapp, *Special Report 125, Mines and Mineral Deposits in Death Valley National Monument, California* (1976); Westec Services, Inc., *A History of Land Use In the California Desert Conservation Area* (1978); Warren, Knack, and Warren, *A Cultural Resource Overview for the Amargosa-Mojave Basin Planning Units* (1980); Norwood and Bull, *A Cultural Resource Overview of the Eureka, Saline, Panamint and Darwin Region, East Central California* (1980); Greene and Latschar, *Historic Resource Study, A History of Mining in Death Valley National Monument*, 4 vols. (1981); Vredenburg, Shumway, and Hartill, *Desert Fever: An Overview of Mining in the California Desert* (1981); Lingenfelter, *Death Valley & The Amargosa: A Land of Illusion* (1986); Fowler, Dufort, Rusco, and the Historic Preservation Committee, Timbisha Shoshone Tribe, *Residence Without Reservation: Ethnographic Overview and Traditional Land Use Study, Timbisha Shoshone, Death Valley National Park, California* (1995); and Unrau, *A History of the Lands Added to Death Valley National Monument by the California Desert Protection Act of 1994* (1997).

The national park has an impressive inventory of historical resources. The mountains and valleys contain sites associated with early Spanish and American exploration and survey of the vast Mojave Desert region, and the area is laced with remnants of prehistoric and protohistoric Native American trails as well as Euro-American trails, wagon roads, railroads, highways, and other early transportation arteries. The region contains numerous remnants of abandoned mining operations, sites of settlements long gone and nearly forgotten, railroad grades and railway structures. Fence lines, water tanks, and corrals testify to a continuing ranching-grazing industry and scattered remains of homesteads tell of a time when small farming operations were attempted in this arid land. There are significant reminders of early recreational and resort development associated with the advent of tourism to the region, as well as reminders of early federal government administration of portions of the area, including administration, maintenance, and residential buildings constructed by the Depression-era Civilian Conservation Corps.

### EXPLORATION

The first known Euro-American visitors to the Death Valley region were more than 100 emigrants who found themselves trying to escape the desolate region after having attempted a “shortcut” from the Old Spanish Trail, across Death Valley, to the northern California goldfields during the winter of 1849-50. The name Death Valley symbolized the suffering and anxiety endured during their wanderings through the isolated region with its stark mountain ranges and arid valleys. Because of the reputation it acquired, the region remained largely unvisited until rumors of its possible mineral riches spread throughout the West during the 1850s and early 1860s, attracting such explorers as E.

Darwin French who made discoveries leading to a mining rush in the Coso Mountains west of Death Valley.

During the 1850s, railroad surveying parties reconnoitered the present park area, attempting to locate a transcontinental railroad route across eastern California. In the fall of 1853, Lieutenant Tredwell Moore led a party of 17 surveyors, financed by the San Francisco-based Pacific and Atlantic Railroad Committee, to the Death Valley region to locate a railroad route through eastern California and find a suitable connecting pass over the Sierra Nevada. Although the party failed to find a railroad route, Moore's assistant, George H. Goddard, a British artist, cartographer, and amateur naturalist, collected more than 600 geological and botanical specimens, and much new country, including the upper reaches of Death Valley, was mapped for the first time.

The next surveyors to enter the Death Valley and Mojave Desert region arrived with contracts for cadastral surveys to run township, range, and section lines for the U.S. Department of the Interior's General Land Office, and subdivide the land into 160-acre quarter sections for settlers who might come someday. William Denton and his crews surveyed the south end of Death Valley and the Amargosa Desert region in late 1856. At the same time, Alexey W. von Schmidt surveyed Panamint Valley to the west. Early the following year, "Colonel" Henry Washington was hired to extend the surveys into the heart of Death Valley and up the Amargosa until he and his surveyors reached what they judged to be the California-Nevada boundary. The surveys, published in the surveyor general's map of California in 1857, provided the first detailed topography of Death Valley, although the valley itself was marked only as an unnamed "Dry Lake."

During 1861, the United States and California Boundary Commission passed through the Death Valley region. Starting from the Colorado River, the commission completed only about one-third of the boundary between California and Nevada toward its destination at Lake Tahoe. It was not until 1872 that von Schmidt returned to the Death Valley country to run the first complete survey of the boundary line from Lake Tahoe to the Colorado River.

Nevada mining interests turned covetous eyes to Death Valley as a possible shortcut route from the state capital at Carson City to the Pahranaagat Mining District near the southeastern border of the state. In 1866, Nevada's first governor, Henry G. Blasdel, accompanied by the State Mineralogist, R. H. Stretch, led a survey party through Death Valley looking for a shorter route.

The search for a route between Owens Valley and Silver Peak and Pahranaagat east of Death Valley in Nevada brought another expedition through the Death Valley region during the spring of 1867. This party was led by Cavalry Lieutenant Charles E. Bendire from Camp Independence, a fort that had been established in Owens Valley on July 4, 1862, to protect the growing Euro-American mining and agricultural settlements in that area from Indian attack. The party scouted the region east of Coso, through the Panamints, and across Death Valley to the Amargosa and beyond. Maps compiled by some of the scouting parties from Camp Independence during the years from 1862 to

1877, although not easy to interpret, provide information on early routes that passed through some of the lands that were added to Death Valley National Monument in 1994.

George M. Wheeler's extensive topographic and scientific surveys west of the 100th meridian for the U.S. Corps of Engineers during the 1870s earned him national recognition and made an invaluable contribution to the knowledge of the West. During his first major expedition in 1871, Wheeler's men reconnoitered some 72,250 square miles, covering portions of lower Nevada, eastern California, southwestern Utah, and northwestern, central, and southern Arizona and including the Death Valley and Mojave Desert regions. The success of this expedition enabled Wheeler to obtain congressional support for the extensive program of exploration that he would undertake throughout the remainder of the decade. During 1875, his detachments again penetrated Death Valley via Darwin Canyon and Panamint Valley and the Mojave from the south edge of Death Valley to the Colorado River. The Wheeler surveys recorded data on archeology, geology, botany, zoology, and Native Americans and developed topographic maps of the region.

Beginning in the 1890s, scientific exploration expeditions penetrated the region. One of the most noteworthy undertakings was the U.S. Department of Agriculture's Death Valley Expedition in 1891. Crisscrossing the country from Panamint to Pahrump and Saratoga Springs to Sylvania, this expedition was one of the first in a series of biological surveys of the West conducted by naturalist Clinton Hart Merriam, chief of the department's Division of Ornithology and Mammalogy in Washington, D.C., who initiated studies of the geographic distribution of plants and animals in order to define life zones that could be used to assess the suitability of land for farming and ranching.

During the late 1890s and early 1900s, state and federal government geologists arrived in the eastern California desert to conduct the initial scientific studies of the area's geological formations and mineralogical potential. Surveyors from the U.S. Geological Survey mapped most of the region during the early 1900s, producing the first reliable topographic maps of the region. In 1909, Walter C. Mendenhall, who would later become director of the Geological Survey, issued a guide to the "watering places" throughout the eastern California-southern Nevada desert country, providing detailed information and maps on the main routes of travel and the location and description of irrigating and artesian waters and springs in the region.

## **TRANSPORTATION**

During the early 1900s, Francis M. "Borax" Smith attempted to tap his Amargosa Valley borax properties near Death Valley with a traction road, consisting of a rock base wagon road from his newly developed Lila C. Mine to the California Eastern railhead at Ivanpah II (There were three settlements with the name of Ivanpah). In April 1904, a traction engine left Ivanpah on the inaugural trip, but it completed only 14 miles before bogging down. Smith then determined to build the Tonopah and Tidewater Railroad, extending northward from Ludlow through the region to Beatty, Nevada. Operating from 1907 to

1940, the railroad, along with its feeder lines, tapped the growing mining settlements in the region. Clark would also construct the Las Vegas and Tonopah, a feeder line extending from Las Vegas to Beatty and Goldfield that passed through a segment of present eastern Death Valley National Park.

## **MINING**

Mining activities in the present Inyo and San Bernardino counties of the eastern Mojave began during the winter of 1849–50. In Inyo County, two of the Forty-Niners who blundered into Death Valley discovered a promising mineral deposit near one of their campsites in Panamint Valley and carried some of the ore out of the Death Valley region. Because this ore was reportedly used later to fashion a gunsight, this has since been known as the “Lost Gunsight Mine.” The location of the ore deposit is unknown, but is believed to be somewhere in the Panamint or Argus ranges.

In San Bernardino County, gold was discovered at Salt Springs near the Amargosa River in December 1849. This discovery was made by a member of the Forty-Niners who chose not to take the shortcut through Death Valley. This party was led to San Bernardino by Jefferson Hunt, a veteran of the Mormon Battalion.

Fueled by rumors of the Lost Gunsight, a stampede of prospectors scoured the eastern California desert after the discovery of the Comstock silver deposits in 1858-59. During the early 1860s, two groups of prospectors, one led by E. Darwin French and the other by Samuel G. George, discovered and named mountain peaks, a waterfall, a “volcano” (Coso Hot Springs), an antimony mine in Wildrose Canyon, and gold and silver mines in the Coso and Slate ranges, those over-promoted mines being worked until the mid-1860s. Miners from Aurora, Nevada, traveled south to discover the White Mountain City mines, north of Death Valley, in 1861.

In 1865, silver-lead ores were discovered by Mexican miners at Cerro Gordo in the Inyo Mountains west of Death Valley, and southeast of the valley lead deposits were noted east of Tecopa that would be developed as the Gunsight Mine. Cerro Gordo was the most significant discovery of the 1860s, and its development would stimulate the economy of Los Angeles much as the Comstock had contributed to the growth of San Francisco. Mining engineer Mortimer Belshaw systematically developed the entire hill, now known as Cerro Gordo Peak, conquering problems in linking Cerro Gordo to the outside world, smelting ore, and bringing water to the desolate area. Criticized as a ruthless businessman, Belshaw nevertheless furnished the technology and obtained the capital needed to extract a large percentage of the \$17,000,000 in ore values that would be extracted from the peak.

Although the mines at Salt Springs and in the Providence, Coso, and Slate ranges were vacated during the late 1860s because of trouble with Native Americans who sought to protect their traditional lands against the influx of Euro-American miners, the threat of

Indian attack was removed by 1870, and prospectors began heading back to the abandoned portions of the desert.

The prosperous national economy after the Civil War stimulated mining ventures in the California desert region, but the bank panic in 1873 and subsequent depression curtailed speculative capital for mining at the moment when three significant discoveries were made west of Death Valley at Panamint (discovered six months before the crash), Darwin, on the west side of the Argus Range, and Lookout, on the east side of the Argus Range. Charcoal kilns in the Wildrose area were constructed to supply charcoal to the area's mines. Of these three silver-lead districts, Panamint, located on the west side of the Panamint Range, was the most famous and least productive. Within two years after its discovery, over-promoted Panamint City was already on the decline. Darwin and Lookout, located just outside Death Valley National Park, shared the spotlight equally as the significant California desert mining districts of the 1870s, each producing approximately \$2,000,000. Lesser mining ventures were established at Chloride Cliff and Lee in the Funeral Mountains on the east side of Death Valley.

The discovery of nonmetallics in the eastern Mojave, initially of borax and later of talc, ensured the region's industrial future, because in time these commodities far outweighed the more sought-after metallic elements in lasting commercial value. The first productive mining operations in the Death Valley region focused on the extraction and processing of borax during the 1880s. The first borax mine in the valley was operated at the Eagle Borax Works near Bennett's Well from 1882–84, while the later Harmony Borax Works (1883–88) popularized Death Valley with the famous 165-mile 20-mule team wagon run to the railhead at Mojave. The Conn and Trudo Borax Works operated in Saline Valley, west of Death Valley, from the late 1880s to the early 1900s. Borax was discovered at Old Ryan on the east side of Death Valley in 1903, the result of the Pacific Coast Borax Company's search for a deposit to replace the diminishing ore reserves at its Borate mine. In 1915, New Ryan replaced Old Ryan as the center of the company's operations, when the Biddy McCarthy Mine superseded the Lila C. During the early 1900s, borax and sodium carbonate were mined at Soda Lake. In 1911, the Saline Valley salt deposit was developed, and during subsequent years its production would be transported over the Inyos via an engineering marvel known as the salt tram.

Gold mining dominated mining ventures in the eastern California desert region during the 1890s, the Panic of 1893 resulting in political decisions favorable to gold interests over those of silver ventures. During this time, the widespread use of cyanide for treatment of gold ore sent many prospectors out to rework old dumps, and formerly unprofitable mines were reopened. These developments led to discovery and development of the Ratcliff (Radcliffe) and World Beater mines in Pleasant Canyon, the Gem Mine in Jail Canyon, the Oh Be Joyful Mine in Tuber Canyon on the western slopes of the Panamints, and mines in the Ibex Mountains southeast of Death Valley.

Not until the early 1900s did conditions become conducive to large-scale hard-rock mining operations in the eastern California desert region, prompted in part by the improvement of transportation facilities and by a renewal of interest in gold and silver.



The significant discovery at Goldfield, Nevada, in 1903 led to a stampede early the following year. During the fall of 1904, the mining rush extended southward to Rhyolite, and soon spilled over into Inyo and San Bernardino counties in eastern California. A variety of metallic minerals were exploited during the 1900s, including gold (Bullfrog Hills, Skidoo, Ubehebe, Chloride Cliff, Funeral Mountains [especially the Keane Wonder Mine], Black Mountains; antimony (Wildrose Canyon); copper (Greenwater, Kunze, Black Mountains); lead, zinc and silver (Ubehebe, Titus Canyon, Lemoigne Canyon, Galena Canyon, and Wingate Wash); and tungsten (Harrisburg Flats, Trail Canyon). This activity resulted in the formation of boom towns whose progress paralleled for a time the maturation of Goldfield, Tonopah, and Rhyolite in Nevada. Ephemeral mining camps, such as Greenwater sprang up throughout the desert region. These mining ventures flourished until the financial panic of 1907, which resulted in an immediate slowdown of work and often total cessation of mining activity.

During the years immediately preceding and during the nation's involvement in World War I, mining in the eastern California desert region experienced a general revival as prospectors began searching the old dumps for overlooked fortunes in manganese, lead, zinc, talc, and tungsten. Darwin and Cerro Gordo, among others, were "rediscovered," and had record productions during the war years. Nitrate prospecting was conducted in the Ibex and Saratoga Springs areas of Death Valley, prompted by the nation's need for the product to manufacture explosives and fertilizers.

Although the inflationary 1920s put a damper on new mineral discoveries and mining development in the California desert, the Shoshone silver mines provided a modest output. Sulphur deposits were opened in the Crater area in northern Death Valley during the mid-1920s and developed during the 1930s and early 1940s.

The 1930s witnessed a revival of gold mining in the desert. Although the major discoveries occurred in Kern County, older districts experienced revivals. Prospect holes appeared where gold was known to have occurred, and some new discoveries, such as the Marble Canyon placers north of Saline Valley, were made as a result of this heightened interest.

The United States recovered from the Depression largely as a result of the world-wide demand for industrial and military-related products with the onset of World War II. Factories were placed in full production to turn out war materials, and the government paid premium prices for minerals such as tungsten, antimony, manganese, iron, copper, lead, and zinc necessary for military industrial production. Darwin produced more than 100,000,000 pounds of lead and 5,000,000 ounces of silver during 1941-51. Manganese and iron deposits were developed in the Owlshead Mountains south of Death Valley. Concerned that more than 20,000 men were employed at 250 gold mines and 700 placer mines throughout the western United States, the War Production Board issued Limitation Order L-208 on October 8, 1942, classifying gold mines (lode mines producing less than 1,200 tons in 1941 were exempt) as non-essential for the war effort and giving mine owners 60 days to cease operations.

Uranium fever, much like the gold fever of earlier days, swept the eastern Mojave during the mid-1950s. Tungsten prospecting revived after World War II, and a major talc industry that had begun during World War I but had never thrived because of limited markets and remoteness of the deposits revived. Talc has been produced for some years in the Death Valley region, including the Warm Spring-Galena Canyon area, southern Ibex Hills, Owlshead Mountains, and Talc Hills.

### **RANCHING/HOMESTEADING**

Throughout the eastern California desert region, little oases with rich pockets of ground could become for a time more profitable bonanzas than most of the surrounding mineral lands. These isolated patches of fertile soil and perennial springs could produce crops of vegetables, fruit, and hay, or fatten a herd of beef cattle, thus providing quick fortunes for the homesteader or rancher as long as the neighboring mining camps boomed. Although most ranchers held 160-acre homestead claims, they were usually able to irrigate only a fraction of that, while their stock ranged free for miles beyond. The proximity of ranches and mining camps determined the profitability of both, but ultimately it was the size of the ore pocket that limited the size of the salable crop, so as the mines went from boom to bust, so did the ranches.

The natural fecundity of watered land in the region had long been demonstrated by Native Americans, who raised abundant crops of corn, beans, melons, and squash around some of the springs and seeps. During the late 1860s, Mormon Charlie, a progressive Paiute, started a stock ranch east of Death Valley in Pahrump Valley, Nevada, with animals left to him by the miners at Potosi. Euro-American homesteaders soon followed.

Andrew Jackson Laswell, a Kentucky native, is generally credited with being Death Valley's first homesteader, establishing, along with his partner Cal Mowrey, a hay ranch at Bennett's Well during the summer of 1874 to supply the Panamint mines. The Panamint boom also attracted William Johnson, another Kentuckian who started a truck garden and planted fruit trees in the canyon that now bears his name on the west side of Death Valley some six miles east of Panamint City. During the early 1870s, William L. Hunter started a seasonal ranch, which would become known as the Hunter Mountain Ranch, where he left his pack animals, used for his pack train enterprise at Cerro Gordo, to graze while he pursued his mining interests. In 1872, Noah T. Piper, son of English immigrants and a native of Michigan who arrived in California in 1855, established the Oasis Ranch north of the Last Chance Range in Fish Lake Valley to provide foodstuffs for the emerging mining camps in the surrounding areas of eastern California and western Nevada. A few ranchers, such as Charles Murphy who squatted at Pigeon Spring about 1873, also settled in the hills of the Last Chance range north of Death Valley during the Lida, Nevada, boom.

During the late 1870s and 1880s, Euro-American, as well as Native American, settlers established ranches in Death Valley and in areas to the west. Hungry Bill, a Panamint Shoshone, moved back onto Johnson's abandoned ranch, and with the help of George

Hansen, generally known as Indian George, replanted the garden, terraced and irrigated several more acres, and set out more peach trees. Hungry Bill's brother, Panamint Tom, established a ranch in Warm Spring Canyon, and Indian George established a ranch at the mouth of Hall Canyon north of Warm Spring on the east side of Panamint Valley. The Saline Valley Indian Ranch, which may have had 125 inhabitants at its peak, was developed using the waters of Hunter Creek, and on June 30, 1892, a 160-acre land grant, consisting of two 80-acre parcels, was issued to Tom Hunter and Caesar, heads of the ranch's principal families. At the north end of Death Valley, Jacob Staininger, who would become known as the "Hermit of Death Valley," patented land in Upper Grapevine Canyon where he raised mustangs and quail and tended a vineyard. The largest and most profitable ranch in Death Valley, however, was the Greenland Ranch at the mouth of Furnace Creek, established in 1883 as part of the extensive borax operation of William Tell Coleman. Ultimately, this ranching operation would become known as the Furnace Creek Ranch, serving as the focus of tourist accommodations and as the headquarters of Death Valley National Park. Nevares Springs, above the Cow Creek residential area, was homesteaded by Adolphus Nevares in the early 1900s where he grew alfalfa, melons, and vegetables.

Many of the best ranch lands in the Death Valley region were located east of the valley on the Amargosa at Resting Spring, Ash Meadows, and Oasis Valley, and farther east at Pahrump where more than a dozen ranches were started during the mining booms of the 1870s. Charles King, a Yankee from Maine who had joined the gold rush to California in 1850, was the first rancher to settle on the Amargosa, purchasing 1,300 head of cattle in southern California and driving them to Ash Meadows in January 1873 to supply the mining settlements of Panamint, Ivanpah, and Chloride Cliff. Philander and Leander Lee arrived in the Amargosa region with a herd of cattle from the San Joaquin Valley during the Panamint rush in the winter of 1874–75, staking out a spring near King. Farther south in the Amargosa, William and Robert Brown started the first ranch at Resting Spring after discovering silver at Tecopa. Another ranch was established on Willow Creek near Resting Spring to serve the Tecopa mines, and after Ah Foo, a Tibetan, farmed it for several years during the 1880s it became known as China Ranch.

During the 1930s–50s, a few families established homesteaded "recreational ranches" in the Goler Wash and Butte Valley areas in the southwest portion of present Death Valley National Park. Examples of such homesteads are the Myers and Barker ranches.

Many homes stood empty in the east Mojave at the beginning of the Depression. Driven by the economic downturn, people moved into some of these abandoned sites and managed to eke out a living, some people attempting to mine gold on an almost primitive scale. These proud people, unwilling to face the urban soup lines, quietly wrote a chapter in the history of the eastern California desert.

### **FEDERAL ADMINISTRATION**

Until the 1930s, the public lands in the region were administered by the General Land Office (GLO), established in 1812 as a bureau in the U.S. Treasury Department and later transferred to the Department of the Interior in 1849. In 1934, the Taylor Grazing Act provided for the segregation of up to 8,000,000 acres (later raised to 142,000,000 acres) for grazing purposes under the jurisdiction of the newly established Grazing Service (GS) in the Interior Department. The Bureau of Land Management was established in 1946, uniting the functions of the former General Land Office and Grazing Service. The Bureau of Land Management was given responsibility for administration and management of all public lands in the United States and Alaska, including its surface and subsurface resources.

On February 11, 1933, President Herbert C. Hoover issued Executive Proclamation 2028 (47 Stat. 2554), establishing Death Valley National Monument under the provisions of the Antiquities Act of 1906. The original monument's acreage of approximately 1,600,000 acres was expanded by presidential proclamations in 1937 and 1952, increasing the monument's size to nearly 2,100,000 acres. Under the provisions of Title III of the California Desert Protection Act of October 31, 1994 (Public Law No. 103-433; 108 Stat. 4471), Death Valley was designated a national park and acquired jurisdiction over more than 1,200,000 of additional lands formerly administered by the Bureau of Land Management.

### **CIVILIAN CONSERVATION CORPS (CCC)**

The Civilian Conservation Corps, established in 1933 as a New Deal unemployment relief measure during the Depression, maintained three permanent camps in Death Valley National Monument during 1933-42 – the twin camps of Funeral Range and Cow Creek (constructed in 1933) and Camp Wildrose (constructed in 1935). The camps were used, and surviving standing structures are still being used, as park administrative and maintenance buildings. Several spike camps operated for varying periods at Mesquite Spring, Emigrant Canyon, Daylight Pass, and Butte Valley. The CCC developed wells and springs and constructed administration and maintenance buildings, including the Emigrant Ranger Station, residences, facilities at the Timbisha Shoshone Village, roads, trails, parking areas, campgrounds, picnic facilities, and the monument's airplane landing field and water system.

### **RECREATIONAL DEVELOPMENT/TOURISM**

Recognition of the recreational and park values of the California desert was first undertaken during the pre-World War I years by such organizations as the Automobile Club of Southern California and the International Desert Protective Association, both of which encouraged their members to tour the desert and assisted them to do so with maps, sign programs, and lobbying campaigns for better roads. Since that time, the eastern California desert region has attracted an ever increasing number of tourists interested in

taking advantage of its recreational opportunities, including hunting, trapping, rockhounding, hiking, camping, and sightseeing.

Several resorts were developed in the Death Valley region during the 1920s and 1930s to provide visitor accommodations, thus stimulating travel to the national monument. In 1925, Herman W. Eichbaum began construction of a toll road extending from Darwin Wash to Stovepipe Wells via Panamint Valley and Towne Pass. The following year, Eichbaum opened the Stovepipe Wells Resort, consisting of 20 modified tent houses, restaurant facilities, a swimming pool, tennis courts, and a landing strip for the first passenger air service to Death Valley.

About 1927, the Pacific Coast Borax Company converted its employee dormitories at New Ryan to the Death Valley View Hotel and its headquarters building at Death Valley Junction to the Amargosa Hotel. Both resorts, however, were short-lived.

The Furnace Creek Inn was opened in 1927 by the Pacific Coast Borax Company. Like Stovepipe Wells, Furnace Creek Inn employees conducted motor trips to area attractions and led tours to local borax mines. The facility included a swimming pool, golf course, and tennis courts.

Furnace Creek Ranch, initially operated as a ranch associated with the borax operations of William Tell Coleman, was developed into a resort by the Pacific Coast Borax Company in 1933, designed to provide less costly lodgings than the Inn. The ranch features the Borax Museum, telling the story of borax extraction in Death Valley.

During the 1930s, a short-lived small resort and water bottling enterprise was established at Saratoga Springs, and a store, cafe, gas station, and cabins were constructed in Wildrose Canyon, the latter being used until the 1970s when they were removed by the National Park Service.

Construction of Scotty's Castle, a vacation retreat for millionaire Albert Johnson and his wife Bessie on Jacob Staininger's old Upper Grapevine Ranch, began about 1922. Construction continued until 1931, but the never-completed castle became a well-known tourist attraction because of its association with the widely reported antics of Walter Scott (Death Valley Scotty). During the mid-1930s, tours were offered to castle visitors and the Johnsons began charging entrance fees, hired people to staff the tours, and opened a small gift shop. The Gospel Foundation, established by Johnson to administer the castle prior to his death, provided formal tours, overnight accommodations, a gift shop, and a cafe until 1970 when the property was purchased by the National Park Service. The complex looks much as it did during the 1930s, and interpretation and preservation efforts have been focused on the 1931–54 period, the latter year being the date of Scotty's death.

### **TIMBISHA SHOSHONE VILLAGE**

The Timbisha Shoshone people have lived in and around Death Valley since before the arrival of European culture. During the late 1920s and early 1930s members of the tribe lived in four different locations in the Furnace Creek area. Finally in 1936 the Bureau of Indian Affairs (BIA) and the National Park Service agreed on a site south of the Furnace Creek Ranch for a permanent residence area. This site became known as the Timbisha Shoshone Village, an area of approximately 40 acres.

In 1936, under NPS supervision, construction started on nine adobe structures using materials provided by the Bureau of Indian Affairs. These were to be residences for Timbisha families. Adobe was one of the common construction materials of the day in Death Valley. Many NPS structures dating to the 1930s are constructed of adobe.

The following year two communal facilities, a laundry and a trading post, were constructed by the Civilian Conservation Corps under NPS supervision. By 1938 the adobe structures housed most of the Timbisha Shoshone families living in the Death Valley area. Most families lived in their homes into the 1940s. Some moved elsewhere during World War II because of lack of employment in the region of the park. In the 1950s five adobe structures that were perceived to be vacant or semi-occupied were removed by the National Park Service, leaving six structures.

During the early 1980s, the remaining structures were rehabilitated and additional housing was purchased and moved to the village. The village has maintained a population of approximately 40–50 persons through the 1980s and the 1990s.

Beginning in the 1930s, and for many years, there was a permit between the National Park Service and the tribe for use of the village site. In 1983 the Timbisha Shoshone Tribe was granted federal recognition by the secretary of the interior. Since about that time there has not been a formal permit in place.

### **CULTURAL LANDSCAPES**

Many cultural landscapes exist in the national park that are potentially eligible for listing on the National Register, but cultural landscape studies have not been undertaken to identify their character-defining elements. Landscapes reflecting mining, ranching, ethnographic, and administrative activities can be seen throughout the park. Especially significant landscapes are found at Scotty's Castle, Lower Vine Ranch, and the salt tram in Saline Valley, and, in association with many of the CCC-era national monument administration structures. Other significant cultural landscapes include the: (a) contemporary Timbisha Shoshone Village; (b) Chloride Cliff and Keane Wonder mining sites; (c) Cow Creek CCC maintenance yard and administrative area; (d) various large and small mining sites; (e) cultivated areas and orchards connected with ranching and agricultural activities; and (f) extensive layouts of gardens, groves, and recreational facilities related to tourist resorts.

## **NATIONAL REGISTER OF HISTORIC PLACES**

Six historic period properties in Death Valley National Park are listed in the National Register of Historic Places:

- Skidoo – April 16, 1974
- Harmony Borax Works – December 31, 1974
- Eagle Borax Works – December 31, 1974
- Saline Valley Salt Tram Historic Structure – December 31, 1974
- Leadfield – June 10, 1975
- Death Valley Scotty Historic District – July 20, 1978

Five historic properties in the national park have been determined eligible for listing in the National Register of Historic Places:

- Residential, Administrative, Maintenance, and Visitor Use Facilities in Death Valley National Monument Built by the Civilian Conservation Corps – (Multiple Property Nomination) – May 10, 1989: Camp Wildrose Historic District, Cow Creek Historic District, Emigrant Junction Comfort Station (E-85), Park Village Comfort Station (PV-69), Texas Spring Campground Comfort Stations (TS-113, TS-114) and stone picnic tables
- Original Bullfrog–Bullfrog West Extension Mine – September 18, 1980
- Homestake-King and Gold Bar Mines and Mills – July 6, 1981
- Las Vegas and Tonopah Railroad Grade – July 8, 1981
- Lee Historic District – October 5, 1982

Seventeen draft national register nomination forms have been prepared for the following properties in the national park in connection with the aforementioned *Historic Resource Study: A History of Mining*. The forms have been submitted to the Pacific-Great Basin Support Office in San Francisco, but no formal determinations of eligibility have been processed for them:

- Big Talc Mine
- Garibaldi Mine
- Gold Hill Mill
- Harrisburg Historic District
- Hungry Bill's Ranch Historic District
- Journigan's Mill
- Lemoigne Mine and Cabin
- Lost Burro Mine and Mill
- Panamint Treasure Mine
- Queen of Sheba Mine
- Wildrose Canyon Charcoal Kilns
- Chloride Cliff Historic District
- Echo Canyon Historic District

- Greenwater Historic District
- Keane Wonder Historic District
- Corduroy Road
- Furnace Creek Wash Historic District

Three draft national register nomination forms have been prepared for the following historic properties in the lands that were added to the national monument in 1994:

- Barker Ranch
- Panamint City
- Gem Mine and Mill

Four draft national register nomination forms were prepared by the Timbisha Shoshone Tribe through a NPS Historic Preservation Grant:

- Mushroom Rock
- Ubehebe Crater
- Navel Spring
- “Tumpisa” District (Furnace Creek area)

### **MUSEUM COLLECTION**

Park staff are responsible for monitoring, documenting, and preserving a large, diverse museum collection that includes more than 177,000 cataloged objects and specimens, mostly stored in substandard conditions. An additional 23,000 archeological artifacts and records are at the NPS Western Archeological Center in Tucson, Arizona. Museum collections include historical objects and archival documents, archeological artifacts, ethnological materials, biological specimens, geological samples, and paleontological materials. Numbers of currently cataloged objects in the various disciplines range from an estimated 78,900 historical objects to approximately 280 ethnological items. There are potentially 1,600 objects associated with the Native American Graves Protection and Repatriation Act of 1990.

The museum collection constitutes an important part of the overall resources offered by the park. In historic districts, the collection constitutes a primary resource that visitors view. A relatively large number of historic objects are on display in the National Register-listed Death Valley Scotty Historic District. Diverse material types are exhibited in the historic house museum as well as on the grounds.



## **RELATIONSHIPS OF NATIVE AMERICAN CULTURES TO THE DEATH VALLEY AREA**

For millennia, American Indian peoples lived within planning area, using the resources and lands to sustain their lives and cultures. These lands have been and continue to be subject to active, often dramatic, and ever-changing natural forces that can alter water supplies, change vegetation zones, make new landforms from tectonic or volcanic events, and include cutting or filling geological processes. Climatic changes that have occurred since the end of the Ice Age have altered moisture in lakes and marshes, affected animal populations and plant life, and challenged humans to adapt. This area is characterized by a series of parallel, northward-draining trough-like valleys between north-south oriented mountain systems that form rain shadows, resulting in more evaporation than precipitation and general aridity. The basic necessities for human life of American Indian peoples are present – water and food, materials for tools, access to routes for traveling, special places for spiritual rites that continue today, and a sense of land association and place identity. These peoples' presence has resulted in a tangible heritage of cultural materials, remembered place names and associations, and attachments to the land from history to modern times.

Nonnative people describe lands as typical of the Great Basin geomorphological zone and of the Sonoran-Mojave Deserts in biological terms. From valley floors to mountain peaks, a series of environmental zones is described from lower elevation scrub plant communities, through Joshua Tree and pinyon-juniper woodlands, to higher elevations of mixed pine and pinyon woodlands. The valleys often contain dry lakes or playas. Transitional foothill zones are cut by drainage systems, forming seeps, springs, and active seasonal streams. To American Indian peoples now known as Mojave, Shoshone, Paiute, Serrano, Chemehuevi, and Kawaiisu, the lands were occupied and used in many ways, with flexible boundaries among these tribal groups. These peoples are differentiated by language, varied subsistence patterns, and self-identification. Specific historic geographical associations to the planning area and places are known from compilations of information used in Federal Indian Land Claims court cases during the 1950s and 1960s.

In general, tribal peoples historically occupied their lands in small, mobile social units of related families who traveled in regular patterns, establishing summer or winter camps in customary places with water supplies, often located at a border between scrub or woodland zones. Some localities contained richer and more dependable food resources than others, but the lands did not support large numbers of persons at any one location. Many plants yielded seed, nut, tuber, or fiber foods, prepared for consumption or for storage at convenient caches. Large or small land mammals were hunted or caught, birds such as doves or quail were snared, and reptiles were collected, but not all plants or fauna were sought. The diet for these native peoples was largely vegetarian, supplemented by mammals, reptiles, and insect sources. Certain places on the lands were and are today considered specially significant; for example, landforms named in oral accounts of travels by supernatural beings, "hot" springs that have curative purposes, petroglyph sites believed to be the products of the shamans' supernatural helpers, or topographic landmarks

identified in complex chants known today as “bird songs.” In essence, “oral maps” of the planning area still exist today in ceremonial knowledge held by certain Mohave and Chemehuevi individuals. Other tribal members have documented descriptive names in Shoshone language for places of settlement, gathering camps, and other important locations in the study area.

In the past two centuries American Indian peoples inhabiting the area have changed their territorial ranges in reaction to European and later American direct and indirect pressures, as well as intertribal struggles. U.S. military presence increased at Camp Cady, east of Mojave National Preserve, at established posts in the Owens Valley and at Fort Mohave along the Colorado River in response to increasing American settlers, miners, and ranchers. This resulted in establishment of more concentrated reservations and communities by the early 20<sup>th</sup> century. Earlier movements were caused by groups of families moving toward growing towns, shifting populations from more traditional scattered patterns. For example, from the southern Nevada portion of Southern Paiute-held areas, people now known as Chemehuevi had moved toward the Colorado River valley early in the 19<sup>th</sup> century. Kawaiisu, Koso (also known as Panamint Shoshone) and Serrano peoples were jointly using terrain around the Granite and Providence Mountain ranges during the 19<sup>th</sup> century. Four parcels of land held in trust for American Indian families and individuals became established around Death Valley. These Bureau of Indian Affairs allotments of 160 acres each of trust land, made for residential and ranching purposes of families already living in the immediate areas, were called Indian Ranch, Saline Valley Ranch, Warm Springs Ranch, and Hungry Bill Ranch. Lands within Indian Ranch and Saline Valley Ranch are now retained by descendants. Warm Springs and Hungry Bill parcels were purchased for inclusion in the former Death Valley National Monument.

In the 1950 –1960s, Federal Indian Lands Claims cases involving Chemehuevi, Mojave, and Owens Valley Paiute tribes included documented occupation and use of many mountain ranges, valleys, and resources in the study area. Today’s tribal governments and communities historically associated with the study area are as follows:

- Lone Pine, Fort Independence, Big Pine, and Bishop Indian Tribes were originally established by presidential executive order in 1912. These Owens Valley reservations were altered by land exchanges in the late 1930s for residential purposes for Owens Valley Paiute populations. Each reservation is several hundred acres but cannot support development of tribal enterprises. Wage work, some small-scale ranching and gardening, and some crafts provide income to tribal members. Each community is from 250 to 400 enrolled persons, including intermarried Shoshone and other individuals.
- Timbisha Shoshone tribal peoples include those known as Coso, Panamint and Death Valley Shoshone who ranged within a large area including most of Death Valley National Park and nearby Bureau of Land Management Lands north of Ridgecrest, CA, and along the Nevada-California state line. Timbisha Shoshone were federally recognized in 1983 and have approximately 300 enrolled members.

- The Las Vegas Piute Tribe is composed of “Nuwuvi” people, called Paiute by others, who inhabited present-day southern Nevada from pre-European time to present. In 1911 a small parcel of trust land was established near the town of Las Vegas. Today, the tribe owns the original 16-acre area and a 3,800-acre area north of metropolitan Las Vegas. The tribe numbers about 100 people who gain their economic support from tribal tourism enterprises, retail sales, and wage work.
- The Pahrump Paiute Colony is a nonfederally recognized community of Paiute families in the Pahrump, Nevada area. This organization has served the social and political purposes of the people for more than two decades. It has an informal council leadership and operates on traditional principles of consensus. Population is unknown.

## VISITOR USE, SERVICES, AND FACILITIES

Death Valley National Park has long provided recreational opportunities for people from all over the world. Its nearness to major population centers such as Los Angeles and Las Vegas, combined with major interstate highways, gives residents the opportunity for relatively easy access to many parts of the desert. Most of the landscape is open, with broad vistas of relatively undeveloped land. The vastness of the landscape offers visitors an opportunity for seclusion and a sense of wilderness, even while in a vehicle. Early miners and ranchers developed roads that today offer visitors a chance to drive into many remote locations where informal camping has traditionally occurred. The many roadless areas offer hikers the experience to explore. There are many cultural sites such as abandoned mining districts that many people love to visit. The mountain ranges, such as the Panamint and others offer a contrast to the dry hot valleys, attracting many people in the summers with cooler temperatures and forested areas. Exposed geology and unique wildlife and vegetation are other elements that attract people. The land has many extremes and contrasts which people come to experience, such the high summer temperatures. Most visitors come to the desert simply to see the outstanding scenery of this diverse landscape.

### OUTDOOR RECREATION

**TABLE 3: DEATH VALLEY NATIONAL PARK ANNUAL VISITATION**

	<b>1985</b>	<b>1990</b>	<b>1995</b>	<b>1997</b>
<b>Visitation</b>	576,400	691,000	1,109,400	1,222,762

Most visitation to Death Valley National Park has historically occurred during the cooler months of fall, winter and spring, but recent visitation figures indicate that visitation during the summer months has increased significantly to the point that park staff no longer consider summer the slow part of the year. The months with the highest visitation figures in past years had been November, March, and April. Recent visitation figures show a close balance between visitation in cool and hot months.

Death Valley has attracted people for many reasons, but the prime reasons seem to be the scenic beauty, the opportunity to visit the lowest and hottest place in the western hemisphere, and the notoriety of the name "Death Valley." People are also drawn to the area because of the contrasts which the desert provides to their place of residence. The majority of all visitors spend their time on the paved roads sight-seeing and going to major attractions such as Dantes View, Scotty's Castle and Badwater. Currently, very few of the total number of visitors venture onto unpaved roads to visit the remote sections of the park. These sections include such places as Eureka Dunes, Saline Valley and Hunter Mountain, but that number is expected to increase as a result of recent newspaper and magazine articles and the promotion efforts of local communities.

Visitor surveys were conducted in 1990, 1994 and 1996. The 1990 survey was conducted by contacting visitors in developed and remote areas of the park. The 1994 survey focused on backcountry areas of the park and the 1996 survey was conducted in developed areas and major visitor attractions. The results of these surveys indicate that visitors participated in the following activities:

**TABLE 4: DEATH VALLEY NATIONAL PARK VISITOR ACTIVITIES**

<b>Activities</b>	<b>July 1990 Visitor Survey</b>	<b>March 1994 Backcountry Survey</b>	<b>September 1996 Visitor Survey</b>
Viewing the scenery	96%	97%	96%
Took photographs	91%	NA	92%
Day hiked on trails		74%	
Day hiked cross county	NA	33%	
Day Hiked <2 hours	32%		42%
Day Hiked >2 hours	5%		7%
Visits to mine or historic sites	37%	73%	37%
Toured Scotty's Castle			18%
Picnicked	NA	45%	
Went Shopping	50%	NA	
Car camped overnight		23%	
Drove on dirt road in non 4x4 vehicle		45%	26%
Drove on dirt road in 4x4 vehicle		44%	6%
Rode bike on dirt road		10%	

Other activities which reported less than 20 % participation include: visiting Scotty's Castle, stargazing, driving backcountry roads, taking a tour of the castle, hiking more than two hours, golfing and a mixture of other miscellaneous activities.

- 72% of foreign visitors were from the countries of France, Germany and Switzerland.
- 21% of all visitors were from California.
- 72% of the visitors spent less than 1 day in the park.

The 1994 backcountry (remote sections of the park) survey asked people why they came. People gave the following reasons:

- 96% came to view desert scenery
- 82% came to enjoy the wilderness and open space
- 81% enjoyed recreation such as hiking, driving back roads and camping

- 78% came to experience solitude and quiet
- 57% were there to learn more about local history
- 56% came to view and study plants and animals
- 16% came for “other” reasons such as photography, riding bicycles, study geology and geography, enjoy the warm clean air, and visit family and friends

The backcountry of Death Valley has been primarily used by California residents who return to seek solitude and desert scenery. Most visitors took day hikes and visited cultural sites. The survey also sampled visitors in the recently acquired Eureka and Saline Valleys. The Saline Warm Springs area continues to attract many visitors. It is estimated that 14,000 people travel the Saline Valley road each year. Park rangers reported approximately 120 vehicles parked at the warm springs the day after the Thanksgiving holiday in 1996. Visitation to the Eureka Dunes is unknown at this time, but recent observations indicate a steady flow of visitors during the cooler months. Visitation to the Greenwater Valley and Saratoga Springs is relatively light at this time but may increase in the future.

There is a growing number of people who are choosing to explore the land with a mountain bike. Bicyclists have traveled the Saline Valley road and the Steele Pass road, which connects Saline and Eureka Valleys. BLM rangers have reported an increase in mountain bike use in the Deep Springs Valley, which is north of Eureka Valley. A 1995 backcountry visitor survey for Death Valley indicated that 10% of the users had ridden bikes on dirt roads.

**TABLE 5: DEATH VALLEY NATIONAL PARK VISITOR PROFILE**

<b>Visitor Profile</b>	<b>July 1990 Visitor Survey</b>	<b>March 1994 Backcountry Survey</b>	<b>September 1996 Visitor Survey</b>
California Resident	21%	59%	32%
Foreign Country	72%	9%	69%
Repeat visitor	19%	56%	18%
First time visitor	82%	44%	82%
Average age	41 years	43 years	43 years
Average length of stay	72% stayed less than 1 day	48% stayed 2-3 days	66% stayed less than 1 day

Death Valley is an internationally recognized destination. Commercial tour groups visit Death Valley, often as part of a loop tour, which includes Las Vegas, Grand Canyon and Yosemite. Overnight stays associated with tour buses have increased significantly from 342 buses in 1983 to 2,185 buses in 1995. Many Europeans come by rental car and Asian visitors often come in tour buses. International tourism continues to be strong as currency exchange rates continue to be favorable. Many Europeans come during the hottest part of

the summer to experience the extreme temperatures of summer and a landscape that is often a drastic contrast to their homeland.

## **VISITOR INFORMATION CENTERS**

The park has visitor centers at Furnace Creek and Scotty's Castle. The largest complex, centrally located at Furnace Creek, includes a staffed visitor information desk, interpretive displays on the natural and cultural features of the park, a large auditorium featuring both orientation film and slide programs, and a sales outlet of the Death Valley Natural History Association. This facility, completed in 1960, was planned when annual visitation was 250,000. Its interpretive mediums are dated and focus on the monument lands.

Scotty's Castle visitor center is located in one of the historic structures north of the castle. New displays, which will depict the history of the people, construction of the buildings, acquisition by the National Park Service, and the significance of the complex are now being developed. The visitor center contains a sales outlet, and during the summer season, it serves as a general information and ticket sales counter. The guided tour of the castle involves employees dressed in period costumes that tell the story of how the castle came to be and of the individuals who lived there.

Staffed information/fee collection stations in Beatty and at Stovepipe Wells operate on a full schedule seven days a week year-round. Ranger stations at Grapevine, Wildrose, and Shoshone provide visitors with information and operate with available volunteers.

The park supports a multiagency information center at Lone Pine serving visitors accessing Death Valley from the Owens Valley to the west. Mojave National Preserve's Baker facility assists visitors approaching the park from the I-15 corridor to the south. These facilities provide information, orientation, and interpretation for the park and the region.

## **CAMPGROUNDS**

Death Valley National Park has nine developed campgrounds that offer a variety of camping experiences. Most campground use occurs primarily from November through April because of the cooler temperatures. Most visitor use is concentrated at Furnace Creek and Stovepipe Wells. The Sunset campground at Furnace Creek consists of an expansive open area, which is used by recreational vehicles and trailers. Many people stay overnight in recreational vehicles, but the number of such users appears to be declining. The park recorded 231,902 overnight stays by recreational vehicles in 1979 compared to 165,253 in 1995, a 28% decrease in RV users. Campgrounds at Furnace Creek and the group site at Texas Springs are on a campsite reservation system. Furnace Creek, Stovepipe Wells, Sunset and Texas Springs campgrounds are wheel chair accessible. Mahogany Flat, Thorndike, and Wildrose, on the west side of the Panamint mountain range

(4,100–8,200 feet elevation), are subject to seasonal closures due to snow and other weather.

Death Valley has over 600 developed campsites. The following is a list of the campgrounds and their campsite numbers:

- Emigrant campground – 10 sites
- Furnace Creek – 136 sites
- Mahogany Flat – 10 sites
- Mesquite Spring – 30 sites
- Stovepipe Wells – 200 sites
- Sunset – 1000 sites
- Texas Spring – 92 sites
- Thorndike – 10 sites
- Wildrose – 30 sites

In 1997 five all campgrounds charged a fee, either \$16.00 or \$10.00. Emigrant, Mahogany Flat, Thorndike, and Wildrose campgrounds do not charge fees.

The entrance fee to the park in 1997 was \$10.00. Fees are collected at the Grapevine Entrance Station, Beatty ranger station, Stovepipe Wells ranger station, Furnace Creek visitor center, and Baker visitor center. This is paid on a voluntary basis at the Furnace Creek visitor center. Since there are no entrance stations on state highways 190 or 178, it is not known how many people traveling these roads actually pay the entrance fee.

## **BACKCOUNTRY CAMPING**

Eureka Dunes and Saline Valley Warm Springs have informal campgrounds, which receive moderate to heavy use. The dunes are easily accessible by car while the springs can be accessed by car if the weather provides for good road conditions. The National Park Service traffic count figures indicate a monthly average of 200 cars that go to the dunes. The dunes are habitat to two endangered plants. One of the major threats to these plants is illegal off-road vehicle use. There are an estimated four or five informal campsites north of the dunes along dirt roads. Visitors may also camp along a spur road northeast of the dunes. A day use parking area with a vault toilet and two or three picnic tables is located on the northwest corner of the dunes.

Another day use parking lot is located on the north central end of the dunes. This parking area is large enough to handle an estimated fifteen to twenty cars, depending on how people use the space. A two-foot-high pipe fence frames part of the parking lot to contain vehicles and discourage any driving on the dunes. The parking lot provides direct access to the dunes for hikers and those wanting to play on the sand. To protect endangered plants, minimum impact activities are encouraged.



Saline Valley Warm Springs receives use throughout the year. Over several years, visitors to the springs have built concrete hot tubs, a water system for the tubs, dug pit toilets, maintained the short access road, planted palm trees and a lawn to make their time at the springs more comfortable. In 1997 the National Park Service began enforcing a 30-day limit on camping. Park employees have placed fiberglass posts in the ground to designate campsites. The posts are part of an effort to prevent the camping area from expanding from the present number of sites.

Backcountry camping must be more than 200 yards from any water source but is allowed at previously disturbed campsites that are 2 miles beyond developed areas, maintained roads, or day use areas. Camping is not allowed near the Inyo Mine, Lost Burro Mine, and Ubehebe Lead Mine or off several “day use only” dirt roads such as Titus Canyon and Racetrack road.

## **COMMERCIAL SERVICES**

There are no commercial operation facilities located on federal lands recently acquired. Commercial use permits have been requested for filming and guided horse pack trips tours. More permits for other nonfacility-based commercial operations will most likely be requested in the future. Park employees review compliance requests with park regulations and approve appropriate uses.

Amfac Resorts operates a major visitor resort with lodging, food services, recreation, and employee housing. The Furnace Creek Inn and Ranch are their two major operations, both located on 342 acres of private property. Amfac also manages the concessions operation at Stovepipe Wells, which has lodging, a restaurant, gas station, and swimming pool. They also manage a snack bar and gift shop at Scotty’s Castle. Both operations at Stovepipe Wells and Scotty’s Castle rest on NPS land and are subject to NPS controls on pricing and operations. The combined operations at Furnace Creek provide visitors with 294 rooms, 2 swimming pools, an 18-hole golf course, tennis courts, restaurants, gift shops, a service station, and general store. During the fall, winter, and spring, visitor accommodations are often sold out. Amfac now has 300–325 employees living at Furnace Creek; 89–90 live at Stovepipe Wells and 6 live at Scotty’s Castle.

Panamint Springs Resort is on highway 190 within the park. This commercial operation is on private land and serves as a western gateway to the park. The Park Service has no control over this operation but works in a cooperation with the owners. The resort has camping, lodging, a restaurant, and gas pumps.

## **SOCIOECONOMIC DESCRIPTION OF THE PLANNING AREA**

Additional information on the socioeconomic environment is provided in a separate analysis entitled “Economic Impact Analysis: Northern and Eastern Mojave Planning Area” by Dean Runyan and Associates (Dean Runyan and Associates 1998).

The planning area covers three California counties. Roughly 40% is in San Bernardino, 59% in Inyo and the rest in Mono County. From a regional perspective there are relatively very few people living on private property within the planning area boundary, particularly when the large metropolitan cities of Los Angeles and Las Vegas are considered. Both of these large cities are within 150 miles of the planning area and make a large contribution to the pool of annual visitors. In a recent survey, 81% of all visitors to Mojave National Preserve were from California. About 35% drove 100–200 miles to arrive; 40% traveled between 210 and 500 miles. That would indicate that most visitors are from the Los Angeles or San Francisco areas. There is a great contrast between visitors to Death Valley and Mojave: only 32% of the total visitors to Death Valley are from California, and 69% are international visitors.

### **LOCAL AND REGIONAL COMMUNITIES**

The 1990 census indicated the following community populations:

#### **Trona, California**

Trona, including the Searles Valley, has a population of 2,740. This small mining town is the nearest community to the southwest entrance of Death Valley. It has a high school and elementary school, gas stations, small markets, housing, and a few small restaurants. A doctor was present in 1993, while most residents travel to Ridgecrest for medical services. Water, sewer, and other utilities are available. Police protection is provided by the San Bernardino County Sheriff Substation in Trona.

#### **Lone Pine, Independence, and Big Pine, California**

Lone Pine has a population of 2,062; Independence, 655; and Big Pine, 1,610. These cities are along California Highway 395. Most services are available in Lone Pine, including a school with elementary through high school classes, small markets and restaurants. Police protection is available through the Inyo County Sheriff. Available housing is limited. Growth in the valley is limited by ownership of water rights by the Los Angeles Department of Water and Power. Employment is provided by agriculture, wholesale and retail trade and finance and service related jobs.

### **Bishop, California**

The 1990 census reported the population of Bishop at 3,475, the largest community in Inyo County. The community offers a variety of services including city parks and a recreational complex, county fair grounds, a variety of businesses including motels, gas stations, markets, restaurants and medical services. There are two elementary schools, one high school, and a community college. There are several outdoor recreational areas which are close to the town that provide opportunities for hiking, fishing, camping and other outdoor recreational activities. Most of the employment is in retail sales, travel, dining, recreational services, other services, and local government.

### **Shoshone, California**

Shoshone has a population of 79. Shoshone is a small town whose ownership is dominated by one family. Public services include a post office, gas station, general store, small cafe, motel, medical clinic, and elementary school. Emergency services are provided by the San Bernardino County Sheriff, Highway Patrol, and NPS Ranger who share an office in Shoshone. Available housing is limited.

### **Pahrump, Nevada**

Pahrump, Nevada has a population of 7,424. This community is the nearest source of most major services for residents of the Furnace Creek area. The community has shifted from an agricultural economic base to being a bedroom community for Las Vegas, which is 60 miles to the east. The community is growing at a fast pace. Almost all services are available including, schools, a full emergency medical center, a chain grocery store, banks and other community services. Housing is available with minimal development and no zoning restrictions.

### **Beatty, Nevada**

Beatty Nevada reported a population of 1623 in the 1990 Census report. The town is primarily sustained by gaming, mining and tourism. Public services include facilities such as a medical clinic, elementary and high schools, banks, stores, restaurants, post office and motels. Beatty is the nearest town for park residents living at Furnace Creek and serves as the high school for children of employees living in the park.

## **PARK COMMUNITY**

Death Valley had 95 full-time NPS employees and 14 seasonal employees in 1996. It is estimated that 98% of employees currently live in the park.

Furnace Creek is a small town with a post office, elementary school (K-6), general store, gas station, airstrip, law enforcement personnel, and volunteer fire department. Older children ride a school bus to Beatty, Nevada to attend classes in upper grades.

## **OTHER RESIDENTS**

Currently, Amfac has between 300–325 employees living at Furnace Creek; 89–90 live at Stovepipe Wells and six live at Scotty's Castle.

About 50 Timbisha Shoshone tribal members live at Furnace Creek on parcel of government land located south of the Furnace Creek Ranch. The tribe is actively seeking ownership of a homeland through direction provided by a land suitability study as called for in section 705 (b) of the California Desert Protection Act.

## ROADS AND CIRCULATION

### ROADS

There are five state highway entrances to the park and numerous unpaved entrances. Townes Pass and Furnace Creek, both on California Highway 190, are the principal entrance routes. Other access routes are Jubilee Pass, Daylight Pass, and Grapevine. Daylight Pass is more heavily used in the summer when people do not wish to take the linear route through the valley. Inyo County has indicated an intent to oil their section of the Big Pine road, which serves as an entrance into the northwest corner of the park. Traffic on this entrance is lower than at other entrances; the average daily traffic from 1992 to 1995 is 10 vehicles per day. In 1996 the park recorded 2,988 vehicles for an average of 8.2 cars per day. Use of the Eureka Sand Dunes may increase if Inyo County businesses continue to promote recreational visits to the dunes and if the County Road Department oils the remainder of the Big Pine road to the turn off to the dunes.

The park has a vast network of roads, ranging from high-speed highways to unmaintained four-wheel drive roads. The park staff maintains 696 miles of road. Of that, 243 miles are classified as standard vehicle roads, or paved or unpaved that require no more ground clearance than a standard sedan. High clearance or four-wheel drive roads constitute 442 miles, and about 10 miles are service spur roads. California State Highway 190, the main route through the park, is maintained by the California Department of Transportation (CalTrans). In addition, there are many miles of roads maintained by the county or by mining companies. The park encompasses hundreds of miles of unmaintained four-wheel drive routes. When the monument became a park in 1994, it did not require responsibility for any additional paved roads. Most of the new NPS roads are unpaved four-wheel drive roads that provide access to remote locations such as the Saline Valley and Hunter Mountain. The park has been approached by CalTrans to assume maintenance over about 10 miles of Highway 178 near Shoshone.

The following table shows traffic figures recorded by the California Department of Transportation for 1995. Figures reflect the combined number of vehicles traveling in both directions.

**TABLE 6: AVERAGE DAILY TRAFFIC LEVELS (1995)**

State Highway	Peak Hour *	Peak Month	Annual Average
Route 127, San Bernardino/Inyo County line	110	660	550
Route 178, between Junction 127 and State line	95	890	750
Route 190, junction of Route 136 east of Owens Lake	110	950	550
Route 190, Death Valley Junction	120	860	680

\*Peak hour is the hour during which the heaviest volume of traffic occurs on a roadway.

## TRAILS

The recently acquired lands contain an informal trail that leads up to Darwin Falls. This is a 2-mile round trip, which winds its way up a narrow canyon, through willows until the falls are reached. The trail needs some maintenance including pruning willows to allow hikers to pass through the thickets. The parking area for the trailhead has been pulled back out of the wash. There are informal trails in Saline Valley, where users of the warm springs have created trails to points of interest such as Rod Falls, the Seven Sisters Springs, and the Red Cinder Cone Trail. The Saline Valley road serves as access to trails located in the Inyo Mountains on BLM and USFS land. The Lonesome Miner trail head is accessed from off of the Saline Valley road up Hunter Canyon. This 49-mile trail which generally follows ridgelines extends from Hunter Canyon on the south to Reward Canyon on the north. Access to this trailhead is across NPS land.

There many defined trails or identified hiking corridors within the old monument boundaries. Corridors are often defined by canyons, washes or ridgelines. The lower elevation trails are frequently used during the cooler months of the year while the upper elevation trails get most of their use during the summer. Very few sources of drinking water existing along these trails or corridors, limiting the duration of most hiking activities. Several trails or routes have been identified as day hikes, requiring less than a day to complete the whole route. Trail surfaces vary from paved, boardwalk to unmaintained soil conditions. The park has identified approximately 19 miles of dirt trails, 1.5 miles of paved, 0.25 miles of boardwalk and 17 miles of undefined hiking routes for day use.

Several routes and trails have also been identified for backcountry hikes, requiring more expenditure of time and effort by the hiker. The majority of backcountry hikes are defined as routes following canyons, ridges, abandoned roads or other land features. The park has identified approximately 98 miles of hiking routes or trails for visitor wishing to hike into remote sections of the park. Some springs are present along routes, camping is allowed away from springs and voluntary backcountry permits are recommended. Telescope and Wildrose Peak trails are recommended as both day and backcountry hikes.

Very little trail maintenance has occurred over the years because of restricted staff and budgets. Telescope and Wildrose Peak trails are the only maintained, backcountry trails.

# **ADMINISTRATIVE OPERATIONS AND FACILITIES**

## **FACILITIES**

### **FURNACE CREEK/COW CREEK**

Furnace Creek serves as the main administrative headquarters for the park and has a visitor center and an administrative office. These buildings were built in the late 1960s and are not large enough for all central office staff. As a result, the maintenance, resource protection, and visitor use staff are located at Cow Creek, 3 miles north of headquarters. The original adobe buildings at Cow Creek, built during the CCC era, include the old administrative building and several maintenance buildings. These buildings have gained historic status. The Furnace Creek, Cow Creek area functions as a small town with an airstrip, gas station, store, school, emergency fire, police, medical, and maintenance services. Park management is reviewing possible office space outside the park.

### **SCOTTY'S CASTLE**

Scotty's Castle is located 55 miles north of headquarters. NPS employees work in a modular building located on the upper edge of the grounds. The building was brought in after a fire destroyed a historic building that had served as office space. Other buildings are now used for storing various materials.

### **MAINTENANCE FACILITIES**

More than 70% of the maintenance staff are now located at Cow Creek and 23% are at Scotty's Castle. One maintenance worker and three rangers are located at Stovepipe Wells. Rangers at Wildrose also assist in light maintenance of the three adjacent campgrounds. The maintenance division is responsible for over 50 buildings, 9 campgrounds, 243 miles of standard vehicle paved road, 442 miles of high clearance or 4x4 and 10 miles of service road, 60 houses and 8 water systems. Travel distances and extreme heat are two major obstacles in performing daily operations. Because Death Valley is now the largest national park in the contiguous United States, there are some limitations on how much the park can accomplish under the current conditions. Maintenance and other park staff need three hours to travel from Grapevine to Eureka Dunes and an additional two to three hours to drive from there to the Saline Valley Warm Springs.

The Cow Creek maintenance facility takes care of most visitor and administrative facilities because of its nearness to Furnace Creek and other intense visitor and administrative use zones. Several buildings including the auto shop are contained inside historic structures with adobe walls, which limits renovations and expansions. At this time, there is no

adequate space or facilities for the maintenance operation, and employees are looking to expand onto the abandoned Salt Pan housing area or the current storage yard to the east. California Department of Transportation also has a maintenance yard just south of the main NPS yard.

The maintenance operation at Scotty's Castle maintains the historic structures and grounds, which require special attention. They are also responsible for employee housing at Grapevine, the campground at Mesquite Spring, and facilities at Eureka Dunes.

## **HOUSING**

The majority of the staff live at the Cow Creek housing area which has 59 housing units and 33 transient trailer sites. Stovepipe Wells has seven units; Wildrose has three units; Grapevine has 16 units and two trailer sites; and Scotty's Castle has two units. Nine units are occupied by CalTrans, State Highway Patrol and Natural History Association employees. Grapevine has a severe shortage of housing, which has resulted in employees living at Cow Creek and commuting. A housing development plan for Grapevine has been initiated by park staff. Currently, the park has eight employment opportunities but no park housing available.

Park management is encouraging certain employees to seek housing outside the park. Alternate work schedules have been initiated and telecommuting is being considered.



## **LAND OWNERSHIP AND USE**

### **STATE LANDS**

The Statehood Act of 1850 granted to the state of California all unappropriated and surveyed sections 16 and 36. These sections (state school lands) in the park are being considered for land exchanges with other federal properties in the state. Most of the state land included in those grants within the old Monument boundary has been acquired by the National Park Service through exchange. However, with the recent addition of lands to the parks, the State of California still holds fee title to 82 parcels totaling 41,340 acres. The state also holds mineral rights on several parcels of land. The California State Lands Commission has requested from the secretary of the Interior an exchange of state school lands for other surplus federal properties. The secretary, as specified in section 707 of the California Desert Protection Act, has begun negotiations with the state to finalize the land exchange.

### **WILDERNESS**

On October 31, 1994, Congress designated approximately 3,158,033 acres (95%) of Death Valley as wilderness. Figure 2 provides an overview of the preliminary wilderness boundaries that have been interpreted by the park from the Congressional maps. The California Desert Protection Act (sec. 601b) also provides for the potential automatic creation of another 6,840 acres of wilderness along a powerline corridor from Furnace Creek to Stovepipe Wells upon cessation of the powerline use.

### **MINING**

About 60% of private lands in Death Valley are patented mining claims. There are 19 patented mining claim groups totaling 6,444 acres. The park also has approximately 338 unpatented mining claims covering about 7,000 acres. The National Park Service typically conducts a determination of validity on unpatented mining claims when a proposed plan of operation is received from an operator. This process may result in fewer unpatented mining claims in the Park as those that cannot support discovery of a valuable deposit are contested.

### **PRIVATE LANDS**

Private lands (other than patented claims) occur in seven areas of the park and cover about 4,200 acres. See the "Land Protection Plan" (appendix B) for specific details.

## GRAZING

Cattle have grazed in California's northern and eastern Mojave desert for well over 100 years. Much of the desert had been heavily grazed at various times between 1900 and 1940. Both the acreage and the intensity of livestock use on Federal land in the California desert have declined during this century. This decline may be due to a decrease in demand for beef, stricter controls by the land management agencies, more efficient and cost-effective methods of raising beef at other locations, and a decrease in forage production. Also, the rapid expansion of feral burro populations since their protection under the Wild and Free-Roaming Horse and Burro Act of 1971 has caused conflicts over forage in some areas (BLM 1980).

Cattle raising in the Mojave Desert was apparently never really seen as a growth industry. In 1929, Thompson stated: "The natural conditions in most of the region are unfavorable to raising cattle on the open range, and there seems to be little likelihood that the industry will grow. The principal difficulty is that the supply of natural feed is not sufficient to support the cattle. In the rainy season annual plants that spring up furnish feed, but these quickly die and in most of the region there is no feed for many months."

With the signing of the California Desert Protection Act of 1994, Death Valley National Park acquired a portion of four BLM grazing allotments: Eureka Valley, Last Chance, Hunter Mountain, and Lacey-Cactus-McCloud. Eureka Valley and Lacey-Cactus-McCloud have small acreages with no substantial AUMs. The grazing allotments within Death Valley National Park and relevant data are found in the following table:

**TABLE 7: GRAZING MANAGEMENT IN DEATH VALLEY NATIONAL PARK**

Allotment	Season of Use	Total Acres	Total NPS Acres (% of total)	Total AUMs*	NPS AUMs
Hunter Mountain	November 20 <sup>th</sup> to June 30 <sup>th</sup>	127,200	86,400 (68%)	1,105	1,105
Last Chance	Perennial	90,800	55,600 (61%)	3,267	2,249
Eureka Valley	Ephemeral	17,700	800 (5%)	0	0
Lacey-Cactus-McCloud	Perennial	420,000	760 (<1%)	4,873	0
<b>Death Valley Totals</b>			<b>143,560</b>		<b>3,354</b>

\* An AUM is an Animal Unit Month, the amount of forage required by an adult cow and calf (or an equivalent combination of other animals) for one month (BLM 1984).